BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS

BURTON E. LIVINGSTON, Editor-in Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. I | OCTOBER, 1918 | No. 2

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

207. **Allard, H. A.,** Abnormalities in Nicotiana. Bot. Gaz. **65**: 175–185. Feb., 1918.—Synanthy or coalescence of normally separate flowers appeared 'n plant of *N. alata* Link and Otto (*N. affinis* Moore). As these abnormalities are more or less hereditary, predisposing cause is associated with germ plasm.—Reviews previous work on catacorolla; cites evidence that in some cases this is hereditary. Catacorolla is often associated with mosaic disease in *N. tabacum*, while other species of tobacco, as *N. glauca*, *N. longiflora*, *N. silvestris*, and *N. alata*, also petunias and *Datura stramonium*, which are readily affected with this disease, rarely if ever develop such abnormalities.—Development of two growing points in young plants of F_1 between Maryland Mammoth and Yellow Pryor tobacco is mentioned. Tendency was noted in Maryland Mammoth to develop bifurcation of the main stem. This feature, however, usually appears rather late in development.—Variations in number of corolla lobes and stamens are cited and evidence is presented which shows that corolla lobes and stamen number are same in most instances.—H. K. HAYES.

208. **Anthony, S. A.,** An anomaly of wheat anthers. Jour. Heredity **9**: 166–168, *2 fig.* Apr., 1918. Author cites anomaly of anthers of wheat grown in greenhouse of U. S. Department of Agriculture, differing from usual types of phyllody.—Only half of sporophyll is transformed, and not into leaf or petal, but into a process bearing stigma hairs. Author thinks abnormal physical factors in greenhouse may have had causative bearing.—HERBERT BEAUMONT.

209. **Babcock, E. B.,** The rôle of factor mutations in evolution. Amer. Nat. **52**: 116–128. Feb.-Mar., 1918.—Author refers particularly to work of Morgan and others upon *Drosophila ampelophila* as proof that factors undergo definite alteration, and holds that such alterations or "factor mutations" are sufficient to explain origin of all differences between varieties and races. Author points difficulties in attempting to account by factor mutations for origin of species which have different chromosome numbers. Those which have same chromosome number, but which differ from each other in many characters may readily have originated by factor mutation, by one of following methods: (*a*) One factor mutation may have manifold somatic effects, as in author's oak-like walnut and its parent, the California black walnut, but factor mutations which induce such extensive somatic changes seem to be exceedingly rare. (*b*) Simultaneous mutations may have occurred in several factors, but author regards this extremely doubtful. (*c*) Single factor mutations may have occurred in different individuals of a group, either simultaneously or successively, as evidenced by widespread existence of composite species. Factor mutations not adequate to account for origin of genera and phyla.—P. J. OLSON.

210. **Babcock, Ernest Brown, and Roy Elwood Clausen,** Genetics in relation to agriculture. *15 × 23 cm., xx + 675 p., 239 fig., 4 colored pl.* McGraw-Hill Book Co, New York. Apr., 1918.—Test-book organized in three parts,—part 1 treating of fundamentals, embodying 286 pages in 14 chapters. Part 2, 155 pages, 12 chapters, shows application to art of plant breeding, and part 3, 170 pages, 13 chapters, devoted to their application in practices of animal breeding.—Deals chiefly with well established facts, distinguishing clearly what is known from unknown, points out problems awaiting solution and offers many helpful and practical suggestions for future work. No attempt is made to outline historical development of genetics or to interpret evolution, discussion of historical theories concerning these topics being entirely omitted. Genetics as applied to human race,—eugenics,—is also omitted. Includes working bibliography of literature, excellent glossary, and index complete and arranged in convenient form.—Part 1, fundamentals: after introduction defining science of genetics and its province, stating problems and methods and relation to other biological sciences, begins with consideration of variation, its relation to hereditary and environmental factors and its measurement. Helpful chapter on biometry gives latest and simplest methods for statistical studies. Chapter on physical basis of Mendelism is concise, clear and adequate, dealing merely with fundamentals necessary to understanding of cell behavior and Mendelian phenomena; details not essential to such understanding are not presented. Following chapters treat of independent Mendelian inheritance, linkage relations, nature and expression of Mendelian factors, allelomorphic relationships, factor interactions, factor relations in quantitative inheritance, inheritance of sex, and related phenomena, species hybridization, principles of pure line breeding, and mutations.—Part 2, plant breeding, gives definite directions and methods for improvement of plants through breeding. Considers materials, varieties in plants, and composition of population; discusses rôle of hybridization, and mutation; considers selection of germinal variations and production of new varieties from bud variations; and treats of graft-hybrids, chimeras, breeding disease-resistant plants, and one chapter is devoted to methods, giving specific instructions for planting, taking data, keeping records, conducting tests, etc.—Part 3, animal breeding, considers in similar way known cases of factor-inheritance in domestic animals and points out practical application of this knowledge to problems of animal breeding; treats general aspects of art of animal breeding, variation in domestic animals, discusses grounds against belief in inheritance of acquired characters, treats of hybridization, selection, disease in relation to breeding, determination of sex, fertility, and gives methods of breeding and of conducting breeding investigations.—E. E. Barker.

211. **Backhouse, W. O.,** The inheritance of glume length in *Triticum polonicum.* A case of zygotic inhibition. Jour. Genetics 7: 125–133. Feb., 1918.—*T. polonicum,* commonly known as Polish wheat, is distinguished from other wheat species by long glumes which, in extreme cases, attain length of 40 mm. while ordinary wheat has glume length which averages about 10 mm. *T. polonicum* crosses very readily with *T. durum* and *T. turgidum* and shows total lack of sterile individuals in F_2. Glume length is intermediate in F_1 and segregates in F_2 in ratio of 1 long : 2 intermediate : 1 short-glumed, but correct classification requires breeding test.—Author gives result of crosses between smooth-chaffed variety of *T. durum* known as Kubanka with average glume length of 12 mm. and variety of *T. polonicum* with average glume length of 29 mm., and intermediate pubescence. F_1 had intermediate glume length, averaging 18 mm., but was distinctly pubescent. In F_2 segregation into long-, intermediate- and short-glumed individuals was obtained and plants were classified as pubescent, intermediate or smooth. Short-glumed plants produced felted and smooth individuals in ratio 3 : 1. Large percentage of extremely long-glumed F_1 plants showed short velvety pubescence and several were absolutely smooth. Some of these smooth-chaffed individuals were bred following year and proved homozygous for smoothness. Test crosses of several of these smooth lines with Kubanka showed all smooth progeny in some cases and in other cases 3 rough to 1 smooth-glumed in the short-glumed segregates, although in these plants felting was of minor degree.

The author concludes that long glume inhibits expression of dominant character and that furthermore there was direct relation between length of glume and degree of felting.—In crosses between *T. polonicum* and felted, black-glumed variety of *T. turgidum*, closely related to Rivet wheat, similar results were obtained, F_1 being intermediate for glume length and felting and either white or faintly tinged. All fully colored plants which appeared in F_1 had short glumes except one plant with glume length of 16 mm. Evidence for short-glumed plants shows that color is independent of pubescence. Some of the pure lines were then crossed with Kubanka to determine whether they were homozygous for color. Two individuals of five thus tested produced all tinged individuals in F_1, one all white, and two both white and tinged.—Crosses between Rivet and Polish wheat grown in north of Argentine and in England gave all colorless individuals, while in center of Argentine some short segregates were tinged.—Author concludes that combination of factors from Polish wheat and Rivet inhibits color, for this particular strain of *polonicum* crossed with colored varieties, other than Rivet, gives colored descendants, in climatic conditions under which, crossed with Rivet, they are colorless.—H. K. Hayes.

212. **Bell, Alexander Graham,** The duration of life and conditions associated with longevity. A study of the Hyde genealogy. P. 5–57. Genealogical Record Office. Washington, D. C., 1918.—Author selected Hyde Genealogy (published 1864) because it seemed to describe representative sample of the general population. Following data are tabulated: Age at death of propositus and parents; age of parents at birth of propositus; age of parents at marriage; number of years after marriage when propositus was born. Statistical analysis of these data which describe 8787 persons was made.—Of 2965 persons, whose ages at death were known, average term of life was 34.6 years, 35.2 per cent. of these died before 20 years of age; 7.3 per cent. lived to be over 80. Critical periods in lives were: first year of infancy and adolescence (about 23 years). Material showed heredity to be deeply involved in production of longevity, influence of father seeming somewhat greater than that of mother. What is really inherited is probably tough, wiry constitution, which makes attainment of old age extremely significant.—H. H. Laughlin.

213. **Belling, John,** Lethal factors and sterility. Jour. Heredity **9**: 161–165. Apr., 1918.—Classifies lethal factors into (a) those inhibiting development of zygote; (b) those which act on pollen grains and embryo sacs; (c) "Sublethal factors," not always fatal to the zygote or gamete which possesses them. Discusses results of presence of each type of lethal, giving mathematical formulae.—Lethal factors or factor combinations, acting on the pollen grains and embryo sacs (haploid generation) cause selective elimination of pollen grains and embryo sacs, resulting in partial sterility. In semi-sterility one half of gametes of both sexes fail to develop, due to presence of lethal factors or combinations. Examples in Stizolobium crosses and in *Oenothera Lamarckiana*. In former, fertile and semi-sterile plants occur in equal numbers, and in *Oe. Lamarckiana* only semi-sterile plants are produced, these being heterozygotes of an F_1 population.—Author recognizes several distinct causes for empty pollen grains (and aborted embryo sacs): (a) accidents of environment, not usually selective. (b) Inherited zygotic factors usually causing death of small fraction of pollen grains, not usually selective. All or nearly all of pollen may perish by action of zygotic factors, as in sweet peas with empty anthers, such abortion not being selective. (c) Lethal factors, acting on haploid generation causing semi-sterility. In this case elimination is selective, and F_2 ratios are altered. (d) Partial elimination of pollen grains or embryo sacs by sublethal factors. Two or more of these causes may be operative at same time on same plant.—J. L. Collins.

214. **Boas, Helene M.,** The individuality of the bean pod as compared with that of the bean plant. Mem. Torrey Bot. Club **17**: 207–209. June 10, 1918.—Concludes that pods of bean show individuality, represented by intra-locular correlation of about $r = .29$ in thickness—width index of their seeds.—J. A. Harris.

215. **Butler, Arthur G.**, Ancestral characters in nestlings. Avic. Mag. **9**: 211–213, 234–237. May–June, 1918.—When nestling differs much in color from parents author thinks it represents earlier stage in history of species, such color is usually more uniform and less brilliant. Adults resembling young represent more ancient type than those differentiated from young. Some males become differentiated by sexual selection. In thrushes males of *Merula merula* and *M. boulboul* differ from females; their hybrid males are less black than either species and with red-brown wing patch; their hybrid females differed, one paler than other, and close to *boulboul* female. Young *M. torquata* and *M. merula* hybrids had throat band varying in shape, but its color in both sexes resembled that of *torquata*.—J. P. Kelly.

216. **Cobb, Frieda, and H. H. Bartlett**, Purple bud sport on pale flowered lilac (*Syringa persica*). Bot. Gaz. **65**: 560–562, *1 fig.* June, 1918.—Description of purple bud sport on pale-flowered lilac. Sport occurred on summit of bush ten feet high which had flowered for ten years or more with only pale flowers. Differed from normal in spread of corolla and width of its lobes. In both measurement and color duplicated dark purple cultivated variety. Experiment outlined to test whether a reversion, somatic segregation or periclinal chimaere. —H. K. Hayes.

217. **Cockerell, T. D. A.**, The story of the red sun-flower. Amer. Mus. Jour. **18**: 38–47. *14 fig.* Jan., 1918.—Popular account of sport of *Helianthus annuus* used in production of "red-flowered" sunflowers now somewhat widely cultivated as horticultural novelties. Single wild plant was found with carmine sap-pigment in addition to orange coloration common for species. These two pigments together gave rays conspicuous chestnut-red color. On account of self-sterility it was necessary to cross "sport" with plants having yellow flowers. Cross was made with plant having very pale yellow flowers. F_2 of this cross split up into four classes, one of which had flowers with carmine and pale yellow pigments and which were of wine-red color. Author points out that this particular type is to be expected on the theory of recombination of hereditary factors representing characters present in grandparents.—It is also reported that all annual species of Helianthus thus far tested, cross readily, but that F_1 generations are so nearly sterile that they can not be propagated as horticultural novelties. All inter-varietal crosses in *H. annuus* are reported to be fertile. Mention is made of 50 distinct variations in *H. annuus*; several of these are shown among the 14 illustrations. Three interspecific hybrids are mentioned and illustrated.—Special plea is made for more extensive and intensive study of variations and for their utilisation in development of new horticultural forms. Sun-flowers illustrate most concretely results thus attainable.—A. B. Stout.

218. **Coulter, Merle C.**, Hybrid vigor. Bot. Gaz., **66**: 70–72. July, 1918. Consists largely of selected paragraphs on same subject from Coulter & Coulter's "Plant genetics," p. 169–176.

219. **De Vries, Hugo**, Mass mutations and twin hybrids of *Oenothera grandiflora* Ait. Bot. Gaz. **65**: 377–422. May, 1918—New constant-breeding mutant, called *ochracea*, of *Oe. grandiflora*, occurred repeatedly in high percentage, suggesting mass mutations of Bartlett. Whereas crosses between *grandiflora* and a number of species yield twin hybrids that correspond to those produced by crossing *Lamarckiana* with the same species, crosses between mutation *ochracea* and same species yield uniform progeny. While *grandiflora* crossed with *Lamarckiana* gives triple hybrids (*ovata*, *lutea*, and *brunnea*), mutation *ochracea* crossed with *Lamarckiana* gives only *ovata* and *lutea*. Nature of *grandiflora* is conceived to be due to secondary mutation, producing typical and *ochracea* gametes in equal numbers. Typical species corresponds to 50 percent class in F_2 of Mendelian monohybrid case, mutation *ochracea* to one of the smaller classes, other smaller class being destroyed by lethal factor in close linkage with normal *grandiflora* gametes. *Lamarckiana* does not by itself produce twin hybrids because of second lethal factor closely linked with *laeta* in its gametes. Triple hybrids from *grandiflora* × *Lamarckiana* are derived thus: *brunnea* from typical *grandiflora* × *velutina* gamete of *Lamarckiana*; *lutea* from *ochracea* × *velutina*: *ovata* from (typical *grandiflora* + *ochracea*) × *laeta* of *Lamarckiana*. Triple hybrids are constant in that none of them splits off either of the others, but secondary differences occur.—A. F. Shull.

220. **East, E. M.,** Amer. Nat. 52: 366–368. June–July, 1918.—Review of Babcock and Clausen's "Genetics in relation to agriculture."

221. **Freeman, G. F.,** Producing bread making wheats for warm climates. Jour. Heredity 9: 211–226. May–June, 1918.—Study of inheritance of seed texture through four generations is given. Crosses studied were made between white macaroni wheat (No. 1), soft red bread wheat (No. 3) and soft white wheat (No. 35). Difference in texture of translucent macaroni seeds and opaque seeds of soft wheats lies in proportion of gluten to starch and their behavior in ripening. Thin sections of seeds were made without changing their physical character by grinding and polishing in a manner similar to that used by petrologists in making sections of minerals. Transmitted light causes opaque portions of soft seeds to stand out as these portions are due to air spaces.—Crossed seeds were intermediate in texture. Seeds of F_1 plants (F_2 endosperm) ranged from soft to translucent hard without exhibiting definite classes. Pure hard- and pure soft-seeded plants were obtained in F_3 endosperm, and bred true in following generation. Plants with large proportion of one extreme produced seeds ranging toward that extreme.—Results were explained by use of two factors for increasing percentage of starch. Factors are cumulative in effect, each in homozygous condition giving greater result than when heterozygous. Table shows theoretical genetic classes and actual results in close agreement.—"Yellow berry" in wheat shows opaque spots with definite margins rather than diffuse opaqueness.—Genetic factors have not been fully analyzed but are evidently distinct from those which give rise to true softness. Percentage of "yellow berry" in pure lines of hard wheat is inherited. This character, however, is very sensitive to environment.—Carl Kurtzweil.

222. **Goodale, H. D.,** Inheritance of winter egg production. Science 47: 542–543. May 31, 1918.—A Cornish male was mated simultaneously to (a) Rhode Island Red hens from high fecundity families (mean winter egg production 52.5) and (b) to Cornish females (mean winter egg production 8.47). Cross A gave 33 pullets with mean winter production of 49.2. Cross B gave 11 pullets with mean winter production of 11.6. Author concludes that high-producing hens are able to transmit high fecundity directly to daughters; and that the characteristic is not sex-linked in Rhode Island Reds. Result of Cross A is said to be opposed to results obtained by Pearl in matings between Cornish male and Barred Plymouth Rock females.—Author presents on basis of his results a theory of inheritance of egg-production alternative to Pearl's. He assumes that this character depends on two factors that follow usual Mendelian scheme. Difficulties in this interpretation as well as in that of Pearl are mentioned and briefly discussed.—P. B. Hadley.

223. **Harland, S. C.,** On the genetics of crinkled dwarf rogues in Sea Island cotton. West Indian Bull. 16: 353–355. 1918.—Continuation of previously published report on crossing of Sea Island cotton by a crinkled dwarf "rogue." Sixty-eight F_3 families were grown from F_2 plants of Sea Island type; 46 of these families were mixtures of Sea Island and rogues, giving total of 731 Sea Island plants and 240 rogues; 22 families, having total of 571 individuals, were uniformly Sea Island. Three families derived from rogues gave total of 98 plants,—all rogues. Genetic difference between Sea Island and rogue is therefore inherited in simple Mendelian fashion and this indicates how Sea Island may be purified of this type of rogues. A peculiar rogue reported upon in first paper, which assumed Sea Island charteristics in later stages, gave 39 Sea Island to 16 rogue offspring in F_3. Author considered it of ordinary heterozygous type.—J. P. Kelly.

224. **Hays, Frank A.,** The influence of excessive sexual activity of male rabbits. II. On the nature of their offspring. Jour. Exp. Zoöl. 25: 571–613. Apr., 1918.—Offspring were obtained from 1st, 5th, 10th, 15th, and 20th services, in series of service taking place in rapid succession. Weight, head length, breadth between iliac extremes (measurements taken at 5-day intervals from birth to 90 days), and rate of mortality indicate that offspring from various service-types are not significantly different; hence author concluded excessive sex-activity has no effect on vigor of offspring. Sex ratio shows striking decrease of males from advanced services in series.—J. A. Detlefsen.

225. **Herrman, Charles,** Heredity and disease. Jour. Heredity 9: 77–80. Feb., 1918.—Author reports family of 6 children who die of pulmonary disease in early infancy; second family of 5 children, heart disease, same type. Physicians over-estimate virulence of infection, underestimate susceptibility of individual. Family histories should be made part of physicians' case histories. Author shows pedigree of amaurotic family idiocy, mongolian imbecility, and polydactylism. Inadequate family history study illustrated by example: Child showed sporadic cretinism; mother denied similar family affections; further questioning found father's two sisters operated on for goitre; patient's 16 year-old brother weighed 225 pounds; all indicating family disturbance of thyroid gland and endocrine system.—H. H. LAUGHLIN.

226. **Huntington, George S.,** Modern problems of evolution, variation, and inheritance in the anatomical part of the medical curriculum. Anat. Rec. 14: 359–445. June, 1918.

227. **Jennings, H. S.,** Disproof of a certain type of theories of crossing over between chromosomes. Amer. Nat. 52: 247–261. Apr.–May, 1918.—Mathematical investigation of type of hypothesis that supposes results of crossing over to be due to specific frequencies of exchange between individual members of pairs of genes, rather than to such relations between maternal and paternal groups of genes as are postulated on chiasmatype hypothesis. Formulae are deduced for calculating maximum and minimum frequencies of exchange mathematically possible with given percentages of crossing over. It is then shown that results possible on this view are hopelessly at variance with those actually observed in Drosophila. Jennings points out that this constitutes disproof of the simple specific frequency of exchange hypothesis, which must either be discarded, or be bolstered up with accessory hypotheses that will make it approximate to the chiasmatype hypothesis.—A. H. STURTEVANT.

228. **Jones, Donald F.,** Bearing of heterosis upon double fertilization. Bot. Gaz. 65: 324–333. Apr., 1918.—Reviews work of Collins and Kempton and presents further data to show immediate effect on size of seed in maize due to cross pollination. Heterozygous and selfed seeds on same ears compared. Types crossed by Jones previously selfed 3 to 6 generations. Reciprocal crosses made. All plants of each line descended from some individual in previous generation. The strains used had yellow or white endosperm. Heterozygous seeds in resulting ears were distributed at random and clearly distinguishable. Twenty-four ears with both selfed and crossed seeds obtained. Average increase in weight of crossed seeds was 5 to 35 per cent.—Opposes suggestion of Němec that endosperm hybridization is an adaptation resulting in alteration of food supply to accord with properties of hybrid embryo. Also opposes Coulter and Chamberlain who regard various fusions as stimulus to growth.—Hypothesis again advanced that heterosis is not due to an indefinite physiological stimulus but is result of bringing together of maximum number of growth factors showing partial dominance. Shriveled condition of wheat hybrid seed probably due to favorable aggregation of growth factors for first generation of hybrid plant but not to the hybrid endosperm.—CARL KURTZWEIL.

229. **King, Helen Dean,** Studies on inbreeding. I. The effects in inbreeding on the growth and variability in the body weight of the albino rat. Jour. Exp. Zoöl. 26: 1–54. May, 1918.—Inbreeding for fifteen generations resulted in no decrease in weight of body, inbred females being about equal in weight to controls, males heavier than controls. Decrease in weight during part of the series was due to malnutrition, since it occurred also in controls. Males were heavier than females. Variability of weight is greatest before age of two months in both sexes. Males and females were about equally variable before age of two months; after that age males were more variable than females. Both sexes of inbred rats were more variable than controls early in life, less variable later. Variability decreased in successive inbred generations, but not as rapidly as presumable approach to homozygosis.—A. F. SHULL.

230. **King, H. D.,** Studies on inbreeding. II. The effects of inbreeding on the fertility and on the constitutional vigor of the albino rat. Jour. Exp. Zoöl. **26**: 335–378. *2 fig., pl. 6*, 1918.—Two series of albino rats carried through 25 generations brother and sister mating including altogether 25,452 individuals, total of 3,308 litters. Extreme litter sizes 1 and 17. First litter usually smallest, second litter largest, third and fourth smaller than second. Litter size depends chiefly on age, not on relatedness of parents. Entire inbred series averaged 7.5 young per litter,—stock 6.7. Sterility not increased by inbreeding. Partial sterility occurred in apparently healthy females found due to diseased condition of reproductive organs. Constitutional vigor apparently not impaired to any extent by inbreeding. Two kinds of malformations, taillessness and eyelessness, occurred rarely and appeared not to be heritable. Increased longevity shown by inbred compared to stock rats. Females longer lived than males and less susceptible to disease at all ages. Behavior tests showed inbred rats slower, less active, more timid and nervous and somewhat more savage than outbred animals. High fecundity, early sexual maturity and vigorous growth correlated. Superiority of inbred animals of one series to animals of other series in fertility, earliness of sexual maturity, and longevity considered due to segregation of genetic factors. Conclusion: result of inbreeding depends on character of stock inbred, selection and environment.—D. F. Jones.

231. **Lancefield, D. E.,** Three mutations in previously known loci. Amer. Nat. **52**: 264–269. Apr.–May, 1918—Author reports recurrence of two well known sex-linked mutants of *Drosophila melanogaster*, namely, white eye-color and rudimentary wings, and also appearance of seventh mutant allelomorph of white, namely, "coral" (w^{co}), which is the darkest mutant member of this series, being as dark as dark "bloods" without showing light fluctuations of "blood."—C. B. Bridges.

232. **La Rue, Carl D., and H. H. Bartlett,** An analysis of the changes involved in a case of progressive mutation. Genetics **3**: 207–224. *1 fig.* May, 1918—Authors present data as to length and width of leaves, length of capsules, number of ovules, length of spiral tracheids and of fiber tracheids of the capsules, and length of fiber tracheids of wood at base of stems, in *Oenothera Reynoldsii*, and its three mutational derivatives, *semialta*, *debilis* and *bilonga*. They conclude that increase and reduction in size of entire plant and of organs in this series of mutations involve only number and arrangement of cells, not at all size of cells. Increase in number of cells is taken as criterion of progressive mutation, decrease as representing retrogressive mutation. Mut. *bilonga* is characterized by remarkably long capsules (42–73 mm.). Number of ovules (933–1347 in *bilonga*) is approximately proportional to length of capsule, *Oe. Reynoldsii* having 647–857 ovules in capsules 30–45 mm. long. Percentage of sterility is about same in both forms. In Mut. *semialta* and mut. *debilis* capsules are shorter than in parent species, number of ovules about same, but percentage sterility considerably increased (from 36 percent in *Reynoldsii* to 75 percent in *semialta* and 85 percent in *debilis*). Authors correlate degree of sterility inversely with degree of vegetative vigor (nutrition).—Wood elements from stems of mutation crosses among above-mentioned types showed no differences from those of parental types; this was to be expected as all parents were alike in this regard. One plant of cross mut. *debilis* × mut. *semialta* gave a bimodal curve of length of wood tracheids. It is suggested that possibly this plant was a chimera.

233. **Lillie, Ralph S.,** Heredity from the physico-chemical point of view. Biol. Bull. **34**: 65–90. Feb., 1918—Attempts to analyze into simplest physico-chemical terms the power of specific construction—of structural and chemical synthesis—which is common to all forms of living matter.—The problem of heredity is not to be dealt with by itself, but is identical with most fundamental problem of general physiology, how living protoplasm is synthesized from non-living matter.—Process of specific creative synthesis which lies at bottom of heredity inherent in life process in all of its forms.—Most fundamental property of living matter is power of proliferation at expense of materials and energy taken in from outside. Biologists must, therefore, seek for some general structural or physico-chemical peculiarity of living organisms which enables their substance to build up substance of generally similar kind.—Broadly considered, distinction between growth and reproduction is ill-defined. Physio-

logically both are in many essential features same. Proliferation which leads to growth and proliferation which leads to reproduction with the associated phenomena called inheritance, are, therefore, only artificially distinguishable in organisms as a whole.

Author presents thoughtful discussion of various physico-chemical problems which must be solved to fulfill above ends. Among subjects considered are specific character of proteins of different species. Physiologically corresponding or homologous proteins are more nearly alike the more nearly related the species from which they are isolated. Thus there is a general parallelism between degree of chemical relationship exhibited by homologous proteins and degree of biological relationship of the species from which they are derived. The marked physiological difference in a large number of pairs of stereo-isomers is taken as clear proof that activity of living protoplasm is largely conditioned upon specific space relations of atoms composing the physiologically active molecules. This is particularly true of compounds entering into metabolism. It is suggested that specific constructive metabolism is determined by stereo-structure. Specific non-living organizations found in electro-syntheses are discussed, and it is suggested that in certain regards structure-forming processes in living and non-living systems, otherwise not altogether similar, show significant parallelisms.—In higher organisms special mechanisms of heredity coördination and control have been superimposed upon elementary physico-chemical mechanism which conditions the fundamental proliferative activity. For example, chromosomes may control the detailed character of developmental proliferation.—J. A. Harris.

234. **Nuttall, J. S. W.,** A note on the inheritance of colour in one breed of pigeons—An attempt to demonstrate a Mendeliam type of transmission. Jour. Genetics 7: 119–124. Feb., 1918.—Report of unfinished experiments on "Racing Pigeons." Finds (1) red (*R*) of red chequer or mealy dominant to blue (*r*), (2) presence of chequering (*C*) dominant to its absence (*c*). No mention of previous authors.—L. J. Cole.

235. **Orton, W. A.,** Breeding for disease resistance in plants. Amer. Jour. Bot. 5: 279–283. June, 1918. Brief review of what has been accomplished by breeding for disease resistance. Importance of intercontinental relation in problems of plant diseases pointed out. Nature has been breeding disease resistant plants since the world began. Work of breeder is largely to isolate these forms in plants economically desirable. Elimination of old non-resistant stock important.—History of control by breeding of asparagus rust, cotton wilt, cowpea wilt and root-knot. Favorable results obtained with watermelon wilt, cabbage yellows, tomato wilt, flax wilt and root-rot of tobacco also briefly outlined.—R. J. Garber.

236. **Payne, Fernandus,** An experiment to test the nature of the variations on which selection acts. Indiana University Studies 5 (No. 36): 3–45. Mar., 1918.—Selection increased number of bristles on scutellum of *Drosophila ampelophila*. Increase was not gradual, but indicated series of mutations. Return selection was not effective. Two factors for extra bristles were located, one near zero end of X-chromosome, other in third chromosome. Evidence supports multiple factor interpretation.—E. Roberts.

237. **Putnam, Eben,** Tracing your ancestors. Jour. Heredity, 9: 8–14. Jan., 1918.—Author urges study of ancestors and gives valuable suggestions as to sources of information and methods of recording. Genealogy should be more than collection of names and dates, and should not be limited to male line, as traits do not follow accident of name.—H. H. Laughlin.

238. **Redfield, C. L.,** Some eminent men. N. Amer. Jour. Homeopathy, p. 1–7. June, 1918.—Author cites eminent men to prove relationship between quality of child and age of parent at its birth. Franklin was born when his father was 51; H. W. Beecher, Washington, Lord Kelvin, James Watt, when their fathers were 38; Audubon, when his father was 57; John and Charles Wesley, when their father was 40 and 43 years of age, respectively; Confucius, when his father was 71, Humboldt, when his father was 49. Author emphasizes that such fathers got education first and children afterward; deems anti-Lamarckian opinions unworthy of consideration.—J. P. Kelly.

239. **Riddle, Oscar,** Further observations on the relative size and form of the right and left testes of pigeons in health and disease and as influenced by heredity. Anat. Record 14: 283–334. May, 1918.—In healthy adult doves and pigeons right testis is usually larger, but shorter and thicker, than left. In hybrids these relations are reversed in an increased proportion of cases, reversal being more frequent in generic than in specific hybrids. Reversal makes a male bird more like female, in which left is always larger (or only) gonad. Other work had shown that hybridizing increased the number of males. Author suggests that reversed males are those forced, by crossing, to develop from female-producing eggs.—A. F. Shull.

240. **Riddle, Oscar,** A demonstration of the origin of two pairs of female identical twins from ova of high storage metabolism. Jour. Exp. Zool. 26: 227–254. July 5, 1918.—Author reports two instances in ring dove in which identical female twins arose from a single ovum, and states that each ovum was characterized by "high storage metabolism" ["low (oxidizing) metabolism"]. These eggs were clearly shown not to be double-yolked eggs, and were considerably (24.9 and 43.1 per cent., respectively) larger than the other members of the pair. Both twin-producing yolks were second of the clutch. In addition it is stated that both cases occurred (1) in reproductively over-worked females, (2) in periods of continuous activity, (3) in very short intervals—since the previous clutch, and (4) that such crowded reproduction tends to produce an excess of females.—Author wonders if formation of identical twins was due to causal nexus between extraordinary size of yolks and unusual separation of blastomeres.—Author sketches view according to which size of yolk might influence disposition of segmentation spheres at animal pole, according to which identical twins should arise from extremely large and extremely small eggs of a species, females arising from former and males from latter, according to author's earlier view. Cases reported support this view, although one must await finding of identical males arising from extremely small eggs.—P. B. Hadley.

241. **Schultz, Adolf H.,** Studies in the sex-ratio in man. Biol. Bull. 34: 257–275. April, 1918.—Tertiary or adult sex-ratio for each continent shows slight excess of males, except in Europe. In Europe, female excess grows with advancing age. Greater male mortality and emigration are two potent causes. Secondary or birth sex-ratio shows slight but consistent excess of males. Primary sex-ratio (at time of fertilization) cannot be determined directly, but statistics on still-births and abortions indicate about 10 percent excess of males in primary sex-ratio for there is an excess of males in both cases. Review of literature on supposed causes of deviation from equality of two sexes in primary and secondary sex-ratio appended.—J. A. Detlefsen.

242. **Sinha, S.,** Polydactylism and tooth color. Jour. Heredity, 9: 96. Feb., 1918.—Writer cites recurrence of extra thumb in two successive generations, in first generation only once among 11 sibs, in second generation once among 5 sibs. Shows lack of usual typical dominance of this character. In another family recurrence of brown (vs. white) teeth recorded in three successive generations in matings with normal white.—H. H. Laughlin.

243. **Stout, A. B.,** Fertility in *Cichorium intybus*: Self-compatibility and self-incompatibility among the offspring of self-fertile lines of descent. Jour. Genetics 7: 71–103. Feb., 1918.—Study of seed production in progenies of self-fertile plants of chicory, especially third generation descendants of three self-sterile parents. Over 500 offspring of two original crosses between unimproved cultivated chicory and one wild white-flowered plant tested as to self-fertility. Sterility due to physiological incompatibilities, not to anatomical incompatibilities. Tables giving percentage fertilities of different series show them to be exceedingly fluctuating. Self-sterile plants occur in all series. No very decided family differences apparent. Offspring of parents with self-fertility above 30 percent show somewhat higher percentage of self-fertility than offspring of parents of lower percentage self-fertility (Table VIII). Differences in vegetative vigor and total flower production not correlated with self-fertility.—Author concluded self-incompatibility and self-compatibility in chicory are

not to be described as dominant and recessive characters, or paired allelomorphs, and that there is no simple Mendelian formula that fits results. Factors effecting or prohibiting fertilization are "highly variable as to degree, specificity and transmission in heredity."—HELENE M. BOAS.

244. **Sturtevant, A. H.,** Science 47: 641–621. June 28, 1918. Review of Babcock and Clausen's "Genetics in relation to agriculture."

245. **Sumner, F. B.,** Continuous and discontinuous variations and their inheritance in Peromyscus. II. Amer. Nat. 52: 290–300. June–July, 1918.—Geographical races of Peromys, cus reared in confinement exhibited in general differences (color, length of ear, tail, and foot, width of tail-stripes) which distinguished them in nature, showing that differences were not caused by environment. Differences in tail length and tail-stripe, among animals of same race, are shown to be inherited (coefficients of heredity about + 0.30). Crosses between certain of these races yielded F_1 and F_2 both intermediate, on the average, with F_2 only slightly or not at all more variable than F_1.—A. F. SHULL.

246. **Thomson, J. Arthur,** Scientia 23: 391–393. 1918. French review of J. P. Lotsy's "Evolution by means of hybridization."

247. **Weinstein, Alexander,** Coincidence of crossing over in *Drosophila melanogaster* (*ampelophila*). Genetics 3: 135–172. March, 1918.—In Drosophila crossing over in one region of a chromosome prevents second crossover within considerable distance along chromosome from first crossover. This "interference" progressively decreases as distance from point of initial crossing over increases. Weinstein's work on X chromosome shows that when crossover has occurred in region between eosin and ruby a coincident crossover in region as far from first as that between sable and forked is as likely to occur as though the doubles were distributed according to chance alone. (Coincidence = 1.025). With a greater interval a slight interference *reappears* (Coincidence 0.8572). With a still greater interval this interference rises still higher (Coincidence 0.7221). Some data presented in case of second chromosome indicate that similar relation obtains there also.—Statistical significance of these data is difficult to determine accurately. If this secondary drop in coincidence is real, then important basis for closer definition of mechanism of crossing over has been established. All known facts of coincidence, including this secondary fall, are in accord with view that chromosomes are loosely twisted and that there is definite tendency to form internodes of *particular* length. In case crossing over is due primarily to tension of tightly twisted strands, then an additional condition must be sought to explain this secondary drop.—Triple crossing over with formula for calculating coincidence of such cases, and maximum and minimum values for coincidence are discussed. Three new sex-linked mutations and one already known appeared.—CALVIN B. BRIDGES.

248. **White, Orland E.,** Environment, variation and the laws of heredity. Brooklyn Bot. Gard. Leaflets 6 (No. 2): 1–16. *9 fig.* Apr. 17, 1918.—Except for few verbal changes this semi-popular discussion duplicates previous "Leaflet" by author on same subject (Brooklyn Bot. Gard. Leaflets 4 (No. 2): 1–12. June 28, 1916).—R. J. GARBER.

249. **White, O. E.,** Breeding new castor beans. Jour. Heredity 9: 195–200. *3 fig.* May–June, 1918.—Author briefly mentions botanical relationship of castor bean (*Ricinus communis*); its hundreds of distinct varieties, with variation in size, oil content, and yield; where grown, and future possibilities in United States, owing to war and aeroplane uses. To make castor oil bean growing permanent industry, new varieties must be obtained by breeding, which will possess highest possible oil content, smallest amount of objectionable "acid," adaptability to waste and sandy lands, close, compact fruiting spikes with thin-walled, spineless, "non-popping" seed capsules, productiveness, earliness and long bearing season. These characters exist among innumerable forms and simply need to be brought together into one or more commercial varieties.—Little breeding work has been done with castor beans. They

are excellent material to work with, easily grown, comparatively free from diseases, produce seeds viable for many years and of high germination, and fertile F_1 and F_2 hybrids, even in most extreme crosses. Among characters showing Mendelian behavior are stem, foliage, and seed coat color, glaucous or non-glaucous plants, "popping" (dehiscent), or "non-popping" seed capsules, types of seed coat mottling, seed size and shape, height of plant, compactness and size of fruiting spike, time of maturity, certain leaf characters, etc. Few of these characters have been sufficiently studied to be placed on factorial basis.—Technique of crossing and selfing is given. Cross-fertilization probably does not exceed 5 percent. This small amount of crossing was accounted for by abundance of pollen, comparative proximity of female to male flowers, and sheltering effect of foilage against air currents carrying foreign pollen. As flowers of castor beans are said to be excellent honey producers author thinks greater cross-fertilization might be expected where bees are common.—RICHARD WELLINGTON.

250. **White, Orland E.,** Inheritance studies in Pisum. III. The inheritance of height in peas. Mem. Torrey Bot. Club, 17: 316-322. June 10, 1918.—Author studied height of over two hundred varieties and found problem more complex than heretofore considered. Divides tall (over 4.5 feet) varieties into three distinct groups. Crosses between these types and tall give, F_1 and F_2, all talls, but of different types. Large numbers of internodes usually dominant over smaller number. Believes each tall type represents distinct mutation. Half-dwarfs separated into two generic types (1) long internodes, few in number, (2) short internodes, more numerous. These give F_2 approximately 9:3:3:1.—True dwarfs (6 inches to 3.5 feet) possess 8 to 20 short internodes. Crosses with various types of talls, F_1 always consists of talls with long internodes, although many internodes may not in all cases dominate over few. F_2 generation of tall $\times$ dwarf consists of 4 classes; talls with long internodes, half-dwarfs with either long or short internodes, and true dwarfs, and approximates 9:3:3:1 ratio. This is probably cross made by Mendel.—Author believes previous ideas of inheritance of height in peas have been based upon difference of internode length alone, all short-internode varieties being classified as dwarfs and all long internodes as talls. These in F_2 give 3:1.

Crosses between half-dwarfs with long internodes, and true dwarfs, gave half-dwarfs in F_1 and approximately 3 half-dwarfs (long internodes) and 1 dwarf (short internodes) in F_2. —Author explains above data by presence and absence of five generic factors for height, two of which determine internode length and three the difference in number of internodes.—C. E. MYERS.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*.

[Unsigned abstracts are by the editor.]

251. **Leopold, Aldo,** Foresty and game conservation. Jour. Forestry **16**:404-411. Apr., 1918.—It is pointed out that foresters so far have materially failed to recognize game production as part of their work in connection with handling the forest according to the best practice. This has been due to the dual authority over the game, the lack of a game administration demand, and a possible fear of the interference of game with silviculture. That the work should be handled by foresters is only a natural outcome of the situation as they know conditions, game, and are on the ground with a training which fits them for the work. —Game conservation is compared with silviculture when the various practices of raising, cutting and marketing game are shown to be analagous to silvicultural practices of handling timber lands. So far no forestry method has been applied to the game and destruction of the stand as in the original forests has been the rule. A plea is made for a rational policy in handling the game situation which would add a great deal to the recreational value of the forests.—E. N. MUNNS.

252. Baker, F. S., Aspen reproduction and management. Jour. Forest. **16**: 389–398. Apr., 1918.—Studies of the aspen (*Populus tremuloides*) in the great Basin region have been made to determine the characteristics of seed and vegetative reproduction. Cuttings were made in the spring, in summer and in fall, during these seasons and in even aged stands of 70, 90 and 110 years.—So far, no aspen seedlings have been found in the region, connection to some underground stem of a previous stand always having been found. In five years observations, only in 1917 were any pistillate flowers found and practically all were sterile. Staminate flowers appear every season, but the bulk of the pollen—65 percent of 36 catkins—is infertile. The time of seed production is also associated with dry weather so that germination would be unlikely.—The vegetative production is of great vigor and persistence, and of 5417 sprouts on a clear cut area, 83 percent were root suckers, 9 percent were from old sprout groups, 7 percent were from the root collar, and 1 percent from the stump. Cuttings made in the fall sprout the next spring, those made in the summer do likewise, and those made in the spring may sprout the same year, but the maximum occur in the following season. Spring cutting results in the greatest number of sprouts per unit area, fall cutting the least, while the height growth has been but little affected by the season, the diversity of the stand being of greater importance. Age of the parent stands have little effect on the vigor or size of the sprouts. But if sprouts are taken off before there is sufficient plant food stored up in the roots for the next set of sprouts, the stand is soon exhausted, and may in the successive years destroy the stand entirely. In virgin stands, sprouts occur occasionally in openings and it is found that the heavier this shade the greater the number of sprouts, but also the fewer number that survive.

It was found that sheep damage to the sprout reproduction was proportional to the closeness of the grazing, and three successive years grazing destroyed the stand. Cattle seldom damaged the reproduction except when the area was overgrazed. Bark eating mammals working under a snow cover damage the sprouts considerably at times.—Aspen handled under a clear-cutting system with a coppice regeneration is simple and rotations of under 90 years are indicated. Sheep should be excluded for three years after cutting to insure successful reproduction though moderate cattle grazing may be permitted. A system of brush disposal to prevent sheep doing much damage to the sprout may be possible.—E. N. Munns.

253. Bates, C. G., Concerning site. Jour. Forestry **16**: 383–388. Apr., 1918.—"The only final criterion of site quality is the current annual cubic foot increment of a fully stocked stand of the species under consideration." The "only final criterion" is defined later as the "only satisfactory" one since quality production also should be taken into consideration. This he believes will be obtained under forest management. There is still the question of density and strength of the material in relation to site but complete knowledge is not likely to cause deviation from quantity standard. By "current annual increment" the author understands the growth for a ten-year period which is relatively close to the normal.—The author proposes changing the present system of designation from the Roman to the Arabic, making subdivisions of 30 cubic feet and expressing the site in groups as; 1a, or 1b representing a growth of from 10 to 20 cubic feet per acre, and from 20 to 30; etc.—Height is said to be controlled solely by soil moisture and there is a definite gradient in sap density from the roots to the tree top to maintain the osmotic water transfer at a definite rate. Height growth ceases when the minimum gradient commensurate with the demands of the tree and the maximum density which can be tolerated by the protoplasm of the topmost cells have been reached.—Height relations are taken to be purely moisture relations with height as an index of the density of the soil solution, height alone not summing up all the factors which the forester expresses in "site quality."—Edw. N. Munns.

254. Bhola, Mathura P., Germination of Cupressus torulosa seed. Indian Forester **44**: 175–176. Apr., 1918.—Reports experiments conducted at Pauri during the monsoon rains of 1917. Seeds were sown in pots early in July after being treated in various ways, the pots kept in the open. Seed sown in the nursery gave similar results to the potted seed. Seed

sown in August of the preceding year did not germinate until October. Lowest percentage of germination was obtained when seed was immersed in boiling water for three minutes, while best was obtained without any special treatment. Mixing the seed with manure caused germination in two days less time than when planted without treatment or with simple soaking for 24 hours. The best practice appears to be sowing without previous treatment and just after the break of the monsoon rains, in order to take advantage of the wet weather. —E. N. Munns.

255. Campbell, W. B., The fuel value of wood. Canad. Forest. Jour. **14:** 1632–1633. Apr., 1918.—"An authoritative guide for the wood user, giving accurate data on fuel values." The author goes into the mechanics of fuel combustion and explains the need of air-dry wood, and why woods differ in their heat values. Equal weights of wood, though of different kinds have the same calorific value. A pound of coal has from 12,000 to 13,000 British thermal units, while a pounds of perfectly dry wood has 8,220 British thermal units. The weight of a cord of wood multiplied by 8220; minus the weight of the water contained in the cord, multiplied by 720 gives the heating value of the cord of wood which may be compared with the heating value of the ton of coal worked out in the same way. A table shows the number of cords of wood required to equal a ton of coal, for 17 species. It is pointed out that as the coal contains a large amount of ash, it may reduce the calorific value of a pound of coal to 10,000 British thermal units and so increase the relative value of the wood.—E. N. Munns.

256. Marsden, E., Method of working bamboos. Indian Forester **44:** 147–166. Apr., 1918.—Reports managements studies with *Dendrocalamus strictus* carried on in plots laid out in 1910. Different treatments were tried out, as to frequency of cutting, proportion of new shoots removed, and height of cutting. Cutting annually, whether taking all or part of the stand, or the manner of cutting, show decreased vigor and size in the culms, which averaged 17.7 feet in length and 2.4 inches in diameter. With a rotation of two years, the lengths averaged from 20 to 24 feet, the diameters from 2.5 to 3 inches, the height of cutting having no effect. Where the cutting removed all the culms except new shoots, both lengths and diameters were less than when only half the culms were removed. With the 3-year rotation, the clumps gave much better results, producing more, larger, and longer culms per clump, with a marked increase in the size and number. With a 4-year rotation, the length and diameters average smaller and the number of culms per clump is unchanged.

Other features brought out are: that heavy rains may or may not increase height and diameter growth, that cutting below the ground level has nothing to commend it, and that a rotation of more than 4 years would result in drying up the culm entirely. The topmost internode usually becomes dry in one year, while the rest of the culm stays green for 1 to 3 years. Cutting all the culms from one part of a clump has a tendency to kill that part of the clump, and the removal of all culms except the new ones causes the new shoot to become bent because of lack of support. Cutting should be deferred till as late in the season as practicable, to avoid bending the tender new shoots. Lignification takes place after the shoots are 9 to 10 months old, and when they are 18 months old they are difficult to distinguish from those 30 months old.—Author concludes that some culms must be left standing and that a 2-year rotation leaving half the old culms may be much better than a 3-year rotation taking all the old culms. A system may be based on the size of the clump and the number of new shoots produced, but there is much variation. A modification of the minimum diameter limit may be found to give the best basis for a system.—E. N. Munns.

257. Munns, E. N., Relative frost resistance of Eucalyptus in Southern California. Jour. Forest. **16:** 412–428. 1918.—An unusually cold season was experienced in Southern California in January, 1913, when temperature dropped to 15° in the San Bernardino Valley. The effect of the low temperature on 26 species of *Eucalyptus* was studied on trees of different ages and origin. A description is given of the effect of this freeze, the damage done and the manner of recovery for each species studied and a table lists the species in groups as to their frost-hardiness. Nursery stock is exceedingly liable to damage, but smudging in the lath house prevents much damage.—E. N. Munns.

258. **Osmaston, B. B.,** Rate of growth of bamboos. Indian Forester **44**: 52–58. Feb., 1918.—For 4 months measurements were made on culms of the giant bamboo at Dehra Dun, India, twice a day, or at shorter intervals when the effect of temperature, rainfall, or sunshine was under consideration. It appears that the culms develop towards the end of the rainy season, completing the height growth about 8 weeks after the end of this period. Night growth usually was double that of the day and the author thinks that this has no special relation to the daily periodicity of light and temperature, as the greatest growth occurred during periods of highest humidity. With sunshine comes higher temperature which, unless it is raining, reacts on growth adversely, as the evaporation from the culm reduces turgescence. Under suitable humidity conditions (i.e., during a long continued drizzle) the rate of growth during the day was the same as that during the night, for a 4-hour period. The maximum growth during 24 hours was 13 inches. Tables of growth and charts of temperatures and rainfall at Dehra Dun, for the period under discussion are included.—E. N. Munns.

259. **Puran, Singh,** A preliminary work on the management of wood-tar. Indian Forester **44**: 141–147. Apr., 1918. Analyses show tar made in India from *Pinus longifolia* has the same general characteristics as imported wood tar as to color, odor, consistency and solubility, but differs slightly in specific gravity and the percentage of light oil and pitch. The percentage of heavy oil is practically the same as the imported tar. From the work so far carried on the author believes that local industry can be developed to furnish the Indian market with a satisfactory wood tar. The kiln method will not be possible owing to the small percentage of tar in the wood, and a form of a portable retort must be devised. The charcoal remaining has very little market value.—E. N. Munns.

260. **Record, Samuel J.,** Intercellular canals in dicotyledonous wood. Jour. Forest. **16**: 429–442. Apr., 1918.—In general, dicotyledonous woods with secretory canals confined to tropical or subtropical regions. Such canals occur normally in some large stems while in others arise pathologically from an injury. In some dicotyledonous woods these are either all axial or all radial unlike the conifers which have them in both planes where resin ducts occur normally. Traumatic vertical ducts often originate in these conifers (*Pinus, Picea, Larix, Pseudotseya*) and in *Seqrioia, Abies, Tsuga* and *Cedrus*. In dicotyledonous woods, traumatic radial canals may arise independently of the vertical ones, or both vertical and horizontal duets may arise as a result of injury. The normal arrangement is in tangential series giving the effect of growth rings.—The cells surrounding these ducts are chiefly parenchymatous, with the limiting cells either thick or thin walled. The origin and development are not uniform being schizogenous, lysigneous or schezo-lysigneous depending on the species. The presence of radial ducts is a great help in identifying tropical woods varying in size and number according to the species. The width of the rays vary widely. When very narrow the presence of the duct causes an enlargement while in the wider rays the ducts have no effect. A single ray may contain as high as four ducts. In section the radical canal is circular or elliptical, the limiting cells being thick walled usually. Radial canals are usually associated with vertical ducts in the cortex and, may end blindly in the ray without reaching the pith—extend to the pith and unite with vertical ducts, or connect with vertical ducts in the wood.—Some woods contain secretory cavities instead of canals, the space being spherical in shape and non-muscilaginous, though some muscilaginous cavities have been found.—A synopsis of the various families of the dicotyledons in which intercellular canals in wood have been observed lists Hamamelidaceae, Rosaceae, Leguminoseae, Rutaceae, Simarubaceae, Burseraceae, Meliaceae, Anacardiaceae, Bombaceae, Dipterocarpaceae, Combretaceae, Myrtaceae, Araliaceae, Styraceae, Boraginaceae, Compositae. Comments are made on the canals found in these families. A figure helps explain the text.—E. N. Munns.

261. **Harper, Roland M.,** Changes in the forest area of New England in three centuries. Jour. Forestry **16**: 442–453. Apr., 1918.—Originally the forested area of the New England States was at least 90 percent of the total, but with the increase in population the forests

were destroyed to furnish arable land. Agriculture appears to have reached a maximum about 1875 for the census figures show a decrease in the land being farmed, with a corresponding increase in wooded area. The development of transportation caused a heavy migration from this region to the much more fertile agricultural lands in the Ohio Valley, while manufacturing increased due to the abundance of cheap water power. Data derived from the census figures show the area of forests to have steadily decreased up to about 1850 and that since that time the area in woodland has been increasing; Maine with some 75 percent of her area in forest; New Hampshire, an increase in wooded area from 50 percent to 65 percent; and the other states from 30 to 40 percent, to over 40 percent. Data are shown graphically in a diagram.

The earliest use of wood was for domestic use, in the construction of the dwellings and general farm use, but later log-driving was developed and most material was exported. Later the use of wood for fuel developed to great proportions following the advent of the locomotive which was originally a wood-burner. Pulpwood products began to be important as coal was developed for transportation, being confined chiefly to the spruce forest region. The development of transportation was perhaps the biggest factor in the increase in forest area for lumber from other regions could compete easily with the domestic product, while coal could be brought in and burned in the cities much more economically than wood. How much further the forest area will increase is largely a matter of conjecture.—Edw. N. Munns.

262. **Turner, H. C.,** Effect of planting method upon growth of western yellow pine. Jour. Forestry *16: 399–403. Apr., 1918.—Experiments on planting methods have been carried on* at the Fort Bayard Nursery in the Southwest for several years, since 1912, plantations of western yellow pine being established by the "mound" and by the "side-hole" methods. In this work it was found that the "mound" method gave the highest percent of survival, *and examinations show the average height growth of the 1912 plantings totaled 30.9 inches* for the "mound" method against 26.2 inches for the "side-hole" planted trees. The average height growth in 1915 was 8.4 inches for the "mound" planted and 7.2 inches for the "side-hole," while in 1916 the respective growths were 9.5 and 8.3 inches. Plantations established *in 1913 show the "mound" stock to be 16.35 inches while side-hole averaged 13.78 inches.*

According to the author, the difference in the height growth is due to the manner of planting, distortion of the roots acting adversely upon height development. The "mound" method is acknowledged too expensive for general field planting, but a plea is made for more careful attention to the placing of the roots in reforestation. The separation and spreading of the roots as widely as possible is urged.—E. N. Munns.

263. **Turner, Harry C.,** The effect of planting methods upon growth of western yellow pine. Jour. of Forestry 16: *399–404. 1918.*—Experiments in planting the western yellow pine (*Pinus ponderosa*) in Arizona and New Mexico have been carried on for a number of years. Three methods have been tried; the "Side-hole," the "Middle-of-hole" and the "mound" method. After 3 years, it was found that with care in planting, all three measures gave equally good percentages of survival, though a slight difference was noted in favor of the "mound" method. The 4-year old plantations examined in 1915, when the trees had been planted by the "side-hole" and "mound" methods revealed that the average height of the former was 26.2 inches, and that of the latter was 30.9 inches, the growth in height for 1915 being 7.2 and 8.4 inches, respectively. The other area showed the average of 100 trees planted by the "mound" method to be 16.35 inches, while the average height of the trees planted by the "side-hole" method was 13.78 inches, a difference of 2.57 inches of four years, or 18.65 percent.—Examination of the roots planted by the "mound" method showed an equal development in all directions, while those planted "side-hole," showed a marked tendency to grow one-sided and away from the side of the hole against which they were placed. This root growth has always been a matter of attention in the nursery transplant beds, but up to the present appears not to have received sufficient attention.—E. N. Munns.

HORTICULTURE

W. H. Chandler, *Editor.*

[Unsigned abstracts are by the editor.]

264. **Blake, M. A.,** Observations upon summer pruning of the apple and peach. Proc. Amer. Soc. Hort. Sci. **14**: 14–23. (1917) 1918.—A preliminary report on some experiments with summer pruning started at the New Jersey Experiment Station in 1912. A rather complete review of the literature on summer pruning is given. The author's results indicate that summer pruning of the trees during the first summer after planting tends to reduce the total growth. From observations by practical growers, however, the author is of the opinion that early summer rubbing off of opening buds where branches are not desired may be desirable. While it tends to reduce the growth the first summer it makes unnecessary much pruning that would reduce the growth during the second summer. With older trees the effect of summer pinching back of the shoots was in nearly all cases to permit the pushing of buds that might ordinarily remain dormant. Sometimes when the pinching was done just before a dry period the buds did not push at once, but pushed as soon as there was favorable weather.—The author emphasizes the fact that it is the summer cutting or pinching back of new shoots and not thinning out the shoots that would be expected to influence the maturity of the wood. In his experience generally the effect of this pinching or cutting back was to delay maturity of the wood and fruit also by causing the late growth.

265. **Heinicke, Arthur J.,** Factors influencing the abscission of flowers and partially developed fruits of the apple (Pyrus Malus L.) New York (Cornell) Agric. Exp. Sta. Bull. **393**: 45–114, *figs. 8.* July, 1917.—Results of observations and experiments made during the three seasons 1914–1916, with a view of determining the factors influencing abscission of flowers and partially developed fruits of the apple during so-called "June drop." The literature of the subject is briefly surveyed and a bibliography is appended.—Studies concerning the magnitude of abscission, indicate that from two-fifths to four-fifths of the total number of flowers are lost during the early drop, or within 1 to 4 weeks after the petals fall, and that only 3 to 7 percent remain after the June drop. From one-sixth to one-third of *the total number of flower bearing spurs finally retain fruits, the proportion varying with* the variety, with trees of the same variety, and with different limbs of the same tree. The variations in the latter case were not due to the location of the limb, nor to the angle at which it grew, but it was found that a larger percentage of spurs set fruit on limbs that had produced a relatively light bloom than on those that had produced a full bloom, and that spurs on limbs with large leaves were more fruitful than those on limbs with small leaves.—During 1915, there was no consistent difference in fruitfulness between the spurs arising from 1913 wood and those arising from older wood, but as a rule, spurs arising from lateral buds on 1914 wood set comparatively few fruits in 1915. The spurs occuring near the end of the seasons' growth, or just before the zone of weak buds seemed to be most likely to set fruit.—The vigor of the individual spur was found to be an important factor in abscission, the strong spurs being more apt to retain fruits. As compared to weak spurs, the previous seasons' growth of vigorous spurs is longer, the new spur growth of cluster base is heavier, the bud leaves are more numerous, there are more flowers to the spur and the weight of the lateral growth is greater, all of which points to an abundance of reserve food in adjacent tissues. Furthermore, the diameter of the conducting cylinder on strong spurs is greater, and the leaves are larger than on weak spurs. It has been shown experimentally, that more water passes to strong buds than to weak buds, and that the size of the leaves is influenced by the amount of water available at the time of their expansion. It is believed, therefore, that the flowers and young fruits on weak spurs are handicapped not only by a small amount of reserve food but also by a limited amount of sap.—Experiments in which vigorous cluster bases were totally or partially defoliated show that the bud leaves are necessary as "sap pullers," and that a few leaves are just as good for this purpose as many leaves, so far as the set of fruit is concerned. Flower bearing spurs inclosed in translucent paper bags held more fruit than

those in opaque sacks.—The apples that fall in the early stages of their development have fewer seeds on the average than apples that remain on the tree, but some of the former lot have a relatively high seed content, and many of the latter lot have fewer seeds than the average. Spurs bearing fruit with a low seed value are heavier as a rule than spurs produced on the same limb but bearing fruits with a high seed value. This is shown to be due to the fact that on vigorous spurs, both poorly fertilized and well fertilized flowers develop into fruits; weak spurs, on the other hand retain only those fruits that have a high seed value, which usually means many good seeds.—The term "seed value" is based on a study of the interrelation of weight of fruit, number of seeds and vigor of the spur, and it emphasizes the importance of quality rather than number of seeds. This quality, which is manifested by the ability of the individual seeds to increase the weight of the fruit is associated with the size of the embryo, and it is thought to be the result of cross fertilization. Experiments are recorded which indicate that the seeds affect the osmotic properties of the apple, and in this way influence the movement of sap to and from the fruit. As a result of this influence they are often able to overcome the handicaps of poor conducting tissues and inadequate supply of reserve food, so that apples with many good seeds can develop even on weak spurs.—Experiments have shown that the absciss layer which brings about the loss of the apple is not formed so long as the sap passes into the fruit as it does under normal conditions, or away from it as is the case when the leaves draw sap from the apple; but abscission occurs when the movement of sap through the separation layer is inhibited while the spur is still living, e.g., when the fruit is removed from its stem, or when the transpiration is checked by coating the apple with vaseline, or by exposing the fruit and the spur to humid conditions. —The author concludes "that unfavorable conditions of nutrition and water supply are among the basic factors which cause the normal drop of flowers and partially developed fruits of the apple. All factors that have a direct or an indirect influence on nutrition and water supply of the individual flower and fruit, such as pollination, weather, cultivation, and the like, are of importance. Fruit development, however, is possible without cross-pollination and even under relatively unfavorable weather conditions, so long as the young fruit has an abundant supply of water and of readily available food."—A. J. H.

266. **Oskamp, Joseph,** The rôle of soil temperature in tree growth. Proc. Amer. Soc. Hort. Sci. **14:** 118–126. (1917) 1918.—Report of some studies in soil temperature as influenced by cultural methods in an orchard and the possible bearing which the soil temperature may have on the results of the different cultural methods. The author gives a considerable account of his experience in securing soil temperature records. All thermometers requiring personal reading were found useless and misleading for the purpose in hand, and soil thermographs were therefore adopted.—Temperature records were kept in plots receiving clean cultivation during most of the summer with a rye cover crop; the depth of spring plowing being about 7 inches; plots in grass, the grass being cut and allowed to lie where it fell, when a mulch of a bale of wheat straw to the tree was added; plots with grass which was cut and allowed to lie where it fell; and plots with grass which was cut and raked up around the tree.—The cultural methods did not greatly influence soil temperatures at a depth of 9 inches. The greatest variation in temperature was between the plot with cultivation and the one with grass and wheat straw. These were the two plots, however, that gave the best growth. The author concludes, therefore, that soil temperature is not an important factor in determining the growth of the trees. The heavy mulch maintained the soil temperature a few degrees higher in winter and considerably lower in summer. During the summer months the highest temperature occurred about 10.00 p.m. and the lowest about 12 hours later.

267. **Roberts, R. H.,** Winter injury to cherry blossom buds. Proc. Amer. Sci. Hort. Sci. **14:** 105–110. (1917) 1918.—A preliminary report on the study of winter killing of the fruit buds of the sour cherry (Prunus Cerasus) in Wisconsin. The report gives the amount of killing during the winters of 1915–16 and 1916–17. The fruit buds were killed to a much

any tree the larger percentage of buds was killed on the shorter twigs such as those on the lower portion of the tree. Of the spur buds, those on spurs of medium length were killed in largest percentage. The larger buds were killed worse than smaller ones. Buds on trees that had been defoliated by leaf spot were not killed as badly as those on normal trees. The author gives data to show that the killing is determined by the extent of differentiation at the time winter approaches. Defoliation by checking the differentiation left the bud in a hardy condition. Buds of the Early Richmond trees were killed worse than those of Montmorency. In both cases the old trees were killed worse than the younger. The differentiation was generally more advanced at the beginning of winter with the Early Richmond variety. In many cases not all of the flowers in the bud were killed.

268. **Shaw J. K.**, An investigation of the interrelation of stock and scion in apples. Proc. Amer. Soc. Hort. Sci. **14**: 59. 1917.—An outline of an investigation which has been under way at the Massachusetts Experiment Station for the past 5 years. It is designed to throw light on the effect on the bearing tree of the varying seedling stocks that commonly are used in growing fruit trees. Twenty-three named varieties of apples have been established on their own roots by means of a deep planted root graft, cutting off the seedling root after the scion has established a root system of its own. Varieties vary greatly in their ability to root from the scion. These own rooted trees have been budded to seventeen different varieties. There are included also trees budded on seedling roots by the ordinary nursery method.—The orchards included in this investigation comprise 1414 trees which have been set from one to three years.—The article includes a brief summary of experiences in securing the trees on their own roots and promises a full report as soon as these experiments are completed.—There seems to be differences in the size of the trees on different roots. A summary of the influences affecting the growth of the trees, omitting the factor of soil and age of the trees as they appear at present, seems as follows: (1) The vigor of the scion variety; (2) The rooting ability of the stock variety; (3) The vigor of the stock variety; (4) In certain cases the compatibility of the stock and scion.—J. K. S.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

[Unsigned abstracts are by the editor.]

269. **Atkinson, G. F.**, Selected cycles in *Gymnoconia peckiana*. Amer. Jour. Bot. **5**. 79–83. 1918.—Germination of the aecidiospores of *Caeoma nitens* was found to be "selective," the mode of germination being determined by temperature conditions. When four raspberry plants were kept chilled under bell jars by means of ice during the progress of inoculation (about 60 hours), teleutospores of *Gymnoconia peckiana* resulted in about 1 month on all the plants. The check plants (kept "close beside" the chilled ones under the bell jars) did not develop teleutospores. Earlier experiments by the author (in 1915) had shown that the aecidiospores of *Caeoma nitens* from the dewberry (*Rubus villosus*) would germinate on the surface of water with typical promycelia each bearing four basidiospores. He therefore suggests that the type of rust is dependent on temperature conditions; in the warmer regions south, the spores germinate as promycelia and a one-generation cycle results (*Caeoma nitens*); whereas in cooler regions (as well as in the intermediate regions during colder weather), the aecidiospores germinate by an ordinary long germ tube, and the two-generation cycle results, with the teleutospores of *Puccinia peckiana*.—E. W. Olive.

270. **Bliss, Mary C.**, Interrelationships of the Taxineae. Bot. Gaz. **66**: 54–60. *2 pl.* 1918.—The author calls attention to the great divergence of opinion as to the systematic position of the Taxineae, presents evidence for the belief that they are the most modern group of conifers, and by a study of their anatomy throws light on the interrelationships of the three genera of the family. Resin parenchyma, a tissue normally present in all conifers which are without resin canals, was found abundantly in the wood of stem and root in *Cephalotaxus* but was much less abundant in *Torreya*. In *Taxus* it occurs in the root, a region

believed to be conservative. It is normally absent in the stem of this genus, but was found to occur here in wounded regions. The family is therefore regarded as a reduction series, with *Cephalotaxus* as its most ancient genus and *Taxus* as its most modern one.

271. **Flint, Esther Margaret,** Structure of wood in blueberry and huckleberry. Bot. Gaz. 65: 556–559. *2 pl.* 1918.—The author has studied ray structure in the wood of *Vaccinium* and related genera (*Gaylussacia* and *Rhododendron*) and notes the occurrence of two types of rays, uniseriate and broad. The presence in the latter of two kinds of cells, one dark and rather small, the other light and somewhat larger, is cited as proof that these broad rays are compound structures which have originated by the aggregation of small rays and the transformation of fibers into parenchyma. This process the author believes to have been responsible for the formation of broad rays in *Quercus*, and she calls attention to the essential similarity in structure of the broad rays in these two groups of plants.

272. **Kendall, John N.,** Abscission of flowers and fruits in the Solanaceae, with special reference to *Nicotiana*. Univ. of Cal. Publ., Bot. 5: 347–428. *Pl. 49–53, 10 fig.* 1918.—The work is an amplification of that of Goodspeed and Kendall on Nicotiana and an extension of the investigation to other species of the Solanaceae. Abscission is defined as the detaching of an organ by the separation of actively living cells at or near its base. Material from the genera *Nicotiana, Solanum, Cestrum, Lycopersicum, Petunia, Salpiglossis, Datura, Salpichrora,* and *Lycium* was studied. This included 4 species in which floral abscission never occurs, 4 in which it seldom occurs, and 21 which were examined microscopically to determine the strucure of the separation zone and the method of abscission.—The study of the histology and cytology of the pedicel showed that the separation layer arises near the base except in *Lycopersicum* and *Solanum tuberosum* where it is near the middle or at the base of the most distal internode. The separation layer, a portion of the primary meristem which has retained some of its original activity and where cell walls with high water content, hence probably more readily subject to hydrolysis, are found, is preformed ready to function at any time. The internode may be assumed to be a metabolic gradient with the most active cells at the base. In all species, except *Datura*, the separation cells are characterized by their small size, which is not necessarily significant, their isodiametric shape, large amount of protoplasm and somewhat collenchymatous appearance but no chemical differences could be detected to differentiate these cell walls from those of the neighboring cells. The middle lamella near the base of the pedicel seemed somewhat more easily hydrolyzed by acids than in the more distal portions. The grooves near the separation zone in *Nicotiana* and *Lycopersicum* do not necessarily bear any relation to the abscission region. Mechanical tissue in most of the berry-forming species of the Solanaceae does not extend through the abscission zone but in the pedicel of *Nicotiana* it is developed and frequently holds the fruit to the plant in spite of the abscission of the cortex.—The process of abscission involves the separation of the cells along the middle lamella. No cell divisions or elongations were observed as accompanying abscission. All the cells across the separation layer, except the tracheae and cuticle which must be mechanically broken, take part in abscission. The number of cells involved varies in different species and under different external conditions. The actual separation is brought about by hydrolysis and consequent dissolution of the middle lamella and in part of the secondary cell membranes, probably due to the activity of an enzyme which must be extremely sensitive to slight changes in the environment and continually present in the separation zone of plants showing abscission, although it may suddenly cease to be active as for instance after the opening of the flower. An increase in turgor frequently occurs during abscission and probably serves merely to hasten and facilitate the process. Abscission of the style and corolla in *Nicotiana* and *Datura* resembles that of the flower.—The length of time between anthesis and normal flower-fall due to lack of fertilization differs among varieties of *Nicotiana*, ranging from 5 to 18 days. After pollination, 0.7 to 4 days only elapse between anthesis and corolla-fall, the stimulation of the stylar tissue tending to shorten the period of corolla-fall but having no appreciable effect on floral abscission. After 7 hours, shoots subjected to 1.5 percent of illuminating gas at 19°C. have shown abscission. The

actual time for cell separation is about 30 to 60 minutes. The reaction time for flower-fall due to mechanical injury depends on the age of the flower and the type of injury. Temperature is an important conditioning factor. Abscission is assumed to be directly induced by narcotic vapors, injury to floral organs, especially the ovary, sudden rise in temperature and lack of fertilization. Indirectly, changes in soil conditions and factors evident under normal physiological conditions, such as those causing the abscission of male flowers after anthesis, are effective. Abscission may be produced with illuminating gas in small isolated pieces of pedicel or in hand sections. It is thought to be largely independent of such processes as transpiration, a statement which is supported by experiments which show that abscission is not necessarily induced by checking transpiration from the flower. The author concludes that abscission is fundamentally a physiological problem, the crux of which lies in the bio-chemistry of the cells.—Eloise Gerry.

273. **Loeb, Jacques**, Healthy and sick specimens of *Bryophyllum calycinum*. Bot. Gaz. **66**: 69. 1918.—The author suggests that the plant of *Bryophyllum calycinum* described by Miss E. L. Braun (Bot. Gaz. **65**: 191. 1918) which produced shoots and roots from leaf notches while the leaves were in connection with the plant, was a sick specimen.

274. **Ludwig, C. A.**, and **C. C. Rees**, The structure of the uredinium in *Pussiniastrum Agrimoniae*. Amer. Jour. Bot. **5**: 55–60. *Pl. 8.* 1918.—*Pucciniastrum Agrimoniae* is shown by the authors to have its urediniospores borne in chains, with each chain maturing and detaching only one spore, the terminal, at a time. This work therefore corrects the view presented in the North American Flora, wherein the spores are stated to be borne on pedicels. A new grouping of the Pucciniastratae is therefore suggested: the fern rusts, in which the urediniospores are borne on pedicels; to be separated from *Pucciniastrum*, *Melamsorella*, etc., in which the urediniospores are borne in chains.—The first peridial cells of *Pucciniastrum* are found to arise, as in the ordinary aecidium, by the transformation of the first-formed cells of the chains. No intercalary cells were formed, nor were any chains found having more than three or four spores.—E. W. Olive.

275. **Record, Samuel J.**, Significance of resinous tracheids. Bot. Gaz. **66**: 61–67. *5 fig.* 1918.—The author discusses the occurrence of resinous tracheids in the gymnosperms. He presents evidence to show that they represent reservoirs for excretions from the living cells of the wood, and that the characteristic form of the resinous mass (usually a septum or plate) is taken in response to well known physical laws. He believes that the resin-like plates found in the tracheids and vessels of many angiosperms are essentially similar in their origin and significance to the resinous tracheids of gymnosperms.

276. **Steil, W. N.**, Studies of some new cases of apogamy in ferns. Bull. Torrey Bot. Club **45**: 93–108. *Pl. 4–5.* 1918.—This paper records the results of 6 years' investigation for the purpose of determining to what extent under normal cultural conditions apogamy occurs in the homosporous leptosporangiate ferns, especially the genera *Pellaea*, *Pteris* and *Aspidium*. The paper contains a summary of the literature of the subject, and adds a number of new species to the list of apogamous ferns. The most satisfactory culture medium was sphagnum saturated with a culture fluid, and kept under bell jars with proper aeration. The species in which apogamy is reported for the first time, are the following: *Pellaea atropurpurea* var. *cristata* Trelease, and *P. viridis* (Forsk.) Prantl.; *Pteris cretica* L. (several horticultural varieties); *Aspidium varium* (L.) Sw.; *A. auriculatum* (L.) Sw., and *A. caryotidium* Wallich; *Cyrtonium Fortunei* J. Sm.—In *Pellaea viridis* two embryos were found in a few cases, one apogamous, the other apparently developed from an egg.—The attempts to induce apogamy in *Nephrodium molle*, and *Asplenium nidus*, as recorded by Yamanouchi and Nagai, were unsuccessful. A similar failure to induce apogamy was experienced with *Osmunda regalis*.

The results of his investigations are summarized by Steil as follows: (1) The prothallia of a number of species of ferns in which apogamy was discovered were grown under cultural conditions favorable for the development of sex-organs and embryos in non-apogamous

species. (2) The prothallia of all the apogamous ferns become heart-shaped before the formation of the embryo. Antheridia are produced on the prothallia of all apogamous forms, but archegonia are formed on the prothallia of only a few forms. (3) The embryo usually appears as a compact region of cells posterior to the apical notch and on the ventral side of the prothallium. In a number of species tracheids are visible among the prothallial cells in the pale portion of the gametophyte. (4) First to make its appearance is the apical cell of the leaf, then that of the root, and later that of the stem. A foot has not so far been observed to develop in connection with the apogamous embryos. (5) Either root or leaf or both of these organs may develop on the dorsal side of the prothallium. As a rule, however, they are produced on the ventral side. (6) While the embryo is produced as a rule posterior to the apical notch, it may be formed on a cylindrical or conical "process" and in some instances on the lobes of the prothallium. (7) Several apogamous embryos may be formed on a single prothallium. (8) As in non-apogamous species, secondary prothallia are readily produced, and these form embryos like those of the ordinary prothallia. (9) The "light" area present on the prothallium of some of the apogamous species is rendered more conspicuous in cultures maintained in weak light. The conical or cylindrical "process" increases considerably in length when the prothallia are grown under these conditions. As a result of weak illumination, the embryo is frequently produced as a direct outgrowth of the apical region of the prothallium. (10) By growing the prothallia of *Osmunda regalis* in strong light and preventing fertilization for a year and a half, no embryos were produced apogamously. (11) An investigation extending over a period of 6 years has resulted in the discovery of apogamy in a large number of ferns. The conclusion that apogamy is of frequent occurrence in the genera *Pellaea, Peteris,* and *Aspidium,* is justified on the basis of the many cases so far found in these genera.—DOUGLAS H. CAMPBELL.

277. **Steil, W. N.,** Method for staining antherozoid of fern. Bot. Gaz. **65**: 562–563. *1 fig.* 1918.—The author describes a method for the killing and staining of fern antherozoids by the use of osmic acid and safranin which has given excellent results. He describes briefly the structure of the antherozoids thus treated.—E. W. SINNOTT.

278. **Steil, W. N.,** Bisporangiate cones of *Pinus montana*. Bot. Gaz. **66**: 68. *1 fig.* 1918.—The author notes the occurrence of a few bisporangiate cones on a specimen of *Pinus montana*. The microsporophylls were borne on the lower portion of the cones, the macrosporophylls on the upper. The sporophylls, sporangia and pollen were apparently normal—E. W. SINNOTT.

PATHOLOGY

DONALD REDDICK, *Editor.*

[Unsigned abstracts are by the editor.]

279. **Anderson, H. W.,** The bacterial shot hole of peach. Trans. Ill. Hort. Soc. **51**: 121–128. (1917) 1918.—A description of the disease together with field observations under Illinois conditions. The control by the use of nitrogenous fertilizers and cultivation after the recommendations of Roberts in Bul. 543 U. S. Dept. of Agric. is suggested. Bacterial shot hole or black spot has caused serious damage in southern Illinois peach orchards during the last few years.—H. W. A.

280. **Anderson, H. W.,** Notes on apple diseases in Illinois. Trans. Ill. Hort. Soc. **51**: 413–419. (1917) 1918.—Special attention given to body diseases, especially various types of cankers, crown, and root rots. The death of many apple trees in Illinois is caused by agents other than plant pathogenes. The proper treatment of cankers of various types is discussed. Attention called to the seriousness of blister canker (Nummularia) and the New York apple tree canker (*Sphæropsis malorum*) in Illinois orchards.—H. W. A.

281. **Anonymous,** Barberry eradication and rust control. Department of Agriculture and Labor of North Dakota, Special Circ. *4 p. 1 f.* May 15, 1918.—Statement of relation of wheat rust and barberry with call for complete eradication of the latter.—E. S. Reynolds.

282. **Anonymous,** Plant quarantine legislation. Phytopath. 8: 170–172. 1918.—Text of a bill in Congress [U. S. A.] providing for exclusion of nursery stock from importation and a statement of the attitude of the Federal Horticultural Board to the project.

283. **Appleman, Charles O.,** Special growth-promoting substances and correlation. Science 48: 319–320. 1918.—Growth-promoting substance is probably low in potatoes showing spindling sprout disease.—Suggests that the Bryophyllum plants reported on by Braun (Bot. Gaz. 65: 150–174. 1918) probably were unhealthy.

284. **Arthur, J. C.,** Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. Bot. Gaz. 65: 460–474. 1918.—See No. 385.

285. **Ball, E. D.,** Leaf burn of the potato and its relation to the potato leaf-hopper. Science 48: 194. 1918.—A leaf-burn of potato has been widely prevalent in Northern United States. The margins of the leaves turn brown and the dead areas gradually widen until the leaves die. In Wisconsin the extent of the injury was directly proportional to the number of leaf-hoppers (*Empoasca mali*) present. Typical leaf-burn was produced in four days in cage experiments with this insect.

286. **Berger, E. W.,** Termite injury to sweet potatoes. Florida State Plant Bd. Quart. Bull. 2: 190–191. *Fig. 89.* 1918.—Comparison of the injury caused by termites with that caused by weevil, *Cylas formicarius.*

287. **Bisby, G. R.** and **A. G. Tolaas,** Copper sulphate as a disinfectant for potatoes. Phytopath. 8: 240–241. 1918.—A progress report showing that copper sulfate 3 pounds to 50 gallons of water is somewhat more effective for the control of black scurf (Rhizoctonia) of potatoes than either formaldehyde solution or mercuric chlorid as commonly employed.

288. **Bolley, H. L.,** Control of diseases of farm crops. North Dakota Agric. Exp. Sta Circ. 14: 1–4. 1918.—Concise directions for treatment of grain smuts, seed-born potato diseases and flaxwilt.—E. S. Reynolds.

289. **Boyce, J. S.,** Perennial mycelium of Gymnosporangium blasdaleanum. Phytopath. 8: 161–162. 1918.—Evidence is presented to show that the mycelium of *Gymnosporangium blasdaleanum* is perennial in the wood of *Libocedrus decurrens* and may persist in the vegetative stage for more than 200 years. In addition to witches' brooms the fungus causes spindle-shaped swellings on branches and trunks. The swelling is the result of a decided increase in the development of wood with a negligible increase in the bast. The sapwood and light brown heartwood of the swelling are conspicuously marked with very small dark brown flecks in which mycelium occurs abundantly. No indication of telial sori can be found on the swellings.

290. **Boyce, J. S.,** Imbedding and staining of diseased wood. Phytopath. 8: 432–436. 1918.—Technique for rapid preparation and differential staining of thin sections of dry wood of *Libocedrus decurrens* infected with *Gymnosporangium blasdaleanum.* Method doubtless applicable to other lignified tissues containing fungous mycelium.—Technique for infiltrating with gelatin wood of same host when reduced to a dry and friable condition by *Polyporus amarus.* A differential stain was not found.—A modified method of infiltrating such tissue with paraffin is also described.

291. **Brown, J. G.,** Mistletoe *vs.* mistletoe. Bot. Gaz. 65: 193. *f. 1.* 1918.—*Phoradendron californicum,* a common parasite on Parkinsonia, Prosopis and Acacia was found near Tucson, Arizona, growing on *Phoradendron flavescens* as its host.—H. W. Anderson.

292. **Bureau of Plant Industry,** Plant disease survey. Plant Disease Bulletin 2: 1–18. Mar. 15, 1918.—A summary of the disease survey reports for the month.

293. **Burkholder, Walter H.,** The production of an anthracnose-resistant white marrow bean. Phytopath. 8: 353–359. 1918.—By crossing Well's Red Kidney bean, a variety resistant to the two known biological forms of *Colletotrichum lindemuthianum*, with White Marrow, which is very susceptible to one strain, (F), a strain of the latter variety has been developed which is resistant to both forms of the pathogene. No inoculations were made on the F_1 hybrids, but inoculation experiments conducted on the F_2 generation gave a simple Mendelian ratio of 3:1. Resistance was found to be dominant. Besides the anthracnose resistant White Marrow developed from this cross, resistant strains of several commercial varieties of beans are being isolated. These are the White Kidney, the Vineless Marrow and the Red Marrow.—W. H. B.

294. **Carpenter, C. W.,** Wilt diseases of okra and the Verticillium wilt problem. Jour. Agric. Res. 12: 529–646. *Pl. A and 17–27.* 1918.—The work was undertaken in order to test the theory that there are two similar wilt diseases of the okra induced by two different vascular parasites.—Numerous inoculations and cross inoculations show that *Verticillium albo-atrum* and *Fusarium vasinfectum* are each able to produce a wilt disease of the okra. These diseases can be differentiated only by isolating the causal organism.—In general the Fusarium wilt is more serious in the southern range of okra growing, while the Verticillium wilt is more serious in the northern range of this crop.—It is demonstrated for the first time that cotton may have both of these wilt diseases.—Physiological and morphological studies convince the writer that the genus Acrostalagmus must be united with the older genus Verticillium.—Proper rotation, selection of seed from healthy plants and disinfection of seed are recommended for the control of these diseases.—J. Rosenbaum.

295. **Carpenter, C. W.,** A new disease of the Irish potato. Phytopath. 8: 286–288. *pl. 1.* 1918.—The disease is caused by a mite, possibly of the group Tetranychidæ. It is prevalent in all potato sections of the Hawaiian Islands. The young leaves become bronzed on the lower surface, they twist and curl on the longer axis, become abnormally hirsute and soon dry out and die. Spraying with lime-sulfur solution or dusting with sulfur is a specific.

296. **Dalbey, Nora E.,** Phyllachora as the cause of a disease of corn and a general consideration of the genus Phyllachora. Trans. Ill. Acad. Sci. 10: 230–248. *figs. 1–8.* (1917) 1918.—A disease on corn in Porto Rico caused by a species of Phyllachora similar to P. graminis is described in detail. The question of the validity of the species of this genus as given by Saccardo in "Sylloge Fungorum" is discussed. A table is given illustrating the overlapping of spore measurements and the general confusion which exists in the classification of the genus, Phyllachora. A short bibliography is added.—H. W. Anderson.

297. **Davis, J. J.,** Tilletia on wheat in North Dakota. Phytopath. 8: 247. 1918.—Brenckle's *Fungi Dakotenses* no. 132, is *Tilletia lævis* not *T. tritici*. No. 132a is correctly labeled, *T. tritici*.

298. **Doidge, E. M.,** Potato diseases I: Early blight or leaf curl, Macrosporium solani E. & M. Union S. Afric. Dept. Agric. Bull. Local Series 26. 1918.

299. **Doidge, E. M.,** Potato diseases II: Scab. Actinomyces chromogenus Gasp. South African Fruit Grower 4: 128. 1918.

300. **Doidge, E. M.,** Potato diseases III: Corky or powdery scab, Spongospora subterranea. (Wallr). Johns. South African Fruit Grower 4: 153. 1918.

301. **Duff, George H.,** Some factors affecting viability of the urediniospores of Cronartium ribicola. Phytopath. 8: 289–292. *fig. 1.* 1918.—Urediniospores of *C. ribicola* kept in a low temperature (2–5°C.) incubator were tested at intervals for viability. Germination

could not be induced after 12 weeks. Glass-filtered sunlight at temperatures below 20°C. stimulated germination. Exposure to an electric arc for about 1 hour at a distance of 40 cm. and at a temperature below 20°C. completely inhibited germination. Ultra-violet rays are thought to be responsible. In general the viability of urediniospores is found to be low.

302. **Edgerton, C. W.,** Bean pod meal for culture media. Phytopath. **8:** 445–446. 1918. —Pick the pods in season, cut into small pieces, dry to crispness with artificial heat. Grind to a fine meal and store in glass. Twenty grams of meal is sufficient for 1 l. of medium. Soak the meal 30 minutes in water at 50 to 60°C., filter and proceed as usual.—Tests with various organisms have shown identical growth on agar made from meal and from fresh pods.

303. **Elliott, John A.,** *Nematode injury to sweet potatoes.* Phytopath. **8:** 169. *f. 1.* 1918.—Nematodes found to the depth of 3 cm.

304. **Federal Horticultural Board** [U. S. A.], Service and regulatory announcements. November: 135–142. Jan. 7, 1918. December: 143–148. Feb. 13, 1918.

305. **Federal Horticultural Board** [U. S. A.], Quarterly letter of information No. 25, *p. 23.* Oct., 1917.—Continuation of news letter.

306. **Fitzpatrick, H. M.,** The life history and parasitism of Eocronartium muscicola. Phytopath. **8:** 197–218. *Pl. I., fig. 4.* 1918.—Examination of type specimens has demonstrated the identity of *Eocronartium typhuloides* Atk., *Typhula muscicola Fr.*, and *Clavaria muscigena* Karsten. The new combination *Eocronartium muscicola* (Fries) is proposed.—The fungus is demonstrated to be an obligate parasite, a fact of interest in the light of its close relationship with the rust fungi. The mycelium is intracellular, and traverses all parts of the host, practically every cell being invaded. Diseased plants are normal in appearance, and invaded cells contain unaltered nuclei and cytoplasm. The mycelium is perennial, advancing each year into the embryonic tissue of the new branches. Attempts to grow the fungus on culture media failed. Although the spores germinate, and develop short germ tube growth soon ceases. Artificial inoculations were unsuccessful.—The other known cases of parasitism in the Auriculariaceæ are discussed, and the suggestion is advanced that the Uredinales originated from auriculariaceous fungi parasitic on mosses.—H. M. F.

307. **Fracker, S. B.,** Effect of crown gall on apple nursery stock. Phytopath. **8:** 247. 1918.—The presence of crown gall or hairy root on apple nursery stock in Wisconsin causes a reduction in value of from 17 to 18 percent. Details are given in Jour. Econ. Entom. **11:** 133–135. 1918.

308. **Gilbert, W. W.,** *and* **M. W. Gardner,** *Seed treatment control and overwintering of* cucumber angular leaf-spot. Phytopath. **8:** 229–233. 1918.—Epiphytoties of angular leaf-spot, caused by *Bacterium lachrymans*, may originate either from contaminated seed or from infested soil. Seed disinfection reduces the incidence of the disease nearly one-half. The use of treated or of disease-free seed in fields well removed from previous cucumber patches is recommended as a control measure. The seed is immersed in mercuric chlorid, 1–1000, for five mintues and is then washed with water for 15 minutes.

309. **Gillespie, L. J.,** The growth of the potato scab organism at various hydrogen ion concentrations as related to the comparative freedom of acid soils from the potato scab. Phytopath. **8:** 257–269. 1918.—Various strains of *Actinomyces chromogenus* of known pathogenicity were tested for their tolerance of acid in culture media adjusted to various hydrogen ion exponents. Two of the media were synthetic, designated as citrate and succinate; the third was made with potato broth and is designated as potato-tartrate. Methods of preparation and standardization are explained fully. The organism grew well in a neutral medium but made practically no growth at a hydrogen ion concentration represented by the exponent 5.1 and none at all at 4.8.—The hydrogen ion concentration decreased during growth. The greatest change occurred in the potato-tartrate medium, the changes in exponent ranging from 0.3 to 2.32.

310. **Glaser, R. W.,** The polyhedral virus of insects with a theoretical consideration of filterable viruses generally. Science **48**: 301–302. 1918.—Passage experiments with gypsy moth larvae which seem to demonstrate that the wilt disease of larvae is not caused by an enzyme but by an ultra-microscopic organism, which is capable of passing through a coarse (N) Berkefeld filter. The virus gained in virulence in the fourth passage (the interval from infection to death was reduced). Since certain substances, like chromatin, increase progressively, author resorts to a comparison with other filterable virus diseases in some of which an organism has been cultured, and presents a table summarizing the characteristics of this virus.—Author believes that filterable viruses probably realize Osborn's "hypothetical chemical precellular stage."

311. **Gravatt, G. Flippo, and G. B. Posey,** Gipsy-moth larvae as agents in dissemination of the white pine blister rust. Jour. Agric. Res. **12**: 459–462. 1918.—The larvae of the gipsy moth (*Porthetria dispar*) are found to feed on both the spores and hyphae of the aecial stage of *Cronartium ribicola*. In many cases spore production is stopped by the destruction of fruiting hyphae. The alimentary tracts of larvae taken from rust pustules were found to contain as many as 48,000 and an average of 26,000 spores each. Examination of the excreta *indicated the passage through the intestines of over 300,000 spores per day. Germination* tests indicated, but did not conclusively prove, injury to the spores in passing through the larvae. Thousands of spores were also found adhering to the bodies of the larvae. They feed on the leaves of Ribes and infections on Ribes have apparently been traced to such feeding. As the larvae are known to be sometimes carried by wind as far as twenty miles, they become possible agents of long-distance as well as short-distance spread of the disease within the area infested by the gipsy moth.—Carl Hartley.

312. **Gunderson, A. J.,** Results of spraying experiments at Flora. Trans. Illinois Hort. Soc. **51**: 406–412. (1917) 1918.—Experiments were conducted especially in an effort to find a satisfactory spray schedule for control of apple blotch caused by *Phyllosticta solitaria*. It was found useless to attempt to kill the fungus in the cankers by use of dormant sprays including "scalecide." The use of lime-sulfur spray 3 and 5 weeks after the fall of the bloom successfully controlled blotch under conditions in 1917. Blotch was not controlled by dusting with sulfur.—H. W. Anderson.

313. **Güssow H. T.,** A new method for "hanging drop" cultures. Phytopath. **8**: 447. 1918.—The drop is flattened out in a thin film by placing a small cover glass on it. The method possesses possibilities for the study of anaerobic organisms.

314. **Güssow, H. T.,** Microphotography simplified. Phytopath. **8**: 447–448. 1918.—Method of making photomicrographs is described. A simple drawing apparatus is used, superfluous light is excluded and photographic paper is substituted for drawing paper. This gives negative prints.—Additional apparatus is described for making exposures on photographic dry plates.

315. **Headlee, Thomas J., Geo. A. Dean and E. D. Ball,** Report of the special committee appointed to formulate the attitude of the American Association of Official Horticultural Inspectors on the question of prohibiting importation of nursery stock from foreign countries. Phytopath. **8**: 170. 1918.—Resolutions favoring prohibition.

316. **Henderson, M. P.,** The black-leg disease of cabbage caused by Phoma lingam (Tode) Desmaz. Phytopath. **8**: 379–431. *10 fig.* 1918.—A monographic treatise.—Purpling of foliage is not a good diagnostic character.—Fungus produces sub-epidermal ostiolate pycnida on living tissue and superficial, beaked pycnidia on dead parts.—Mycelium intercellular at first becoming intracellular and causing collapse of tissue.—*Phoma oleracea* and *P. brassicæ* are synonyms, possibly also *P. napobrassicæ*. "*P. oleracea*" on *Meliotus alba* is distinct.—Fungus is a vigorous parasite, infection resulting readily from wound inoculations, spraying *on a spore suspension, wetting roots in a spore suspension at time of transplanting or wetting*

seeds with suspension at planting time.—Incubation period varies from 7 to 28 days. Many cultivated varieties of Brassica are susceptible as well as wild species of this and other cruciferous genera.—Mother seed plants are susceptible in all parts and the mycelium may pass through the wall of the silique into the young seeds where it persists until the following year. Aside from perennation in the seeds the fungus persists over winter in dead plant parts.—Surface disinfection of seed is accomplished best by treatment for 21 minutes in 1:200 solution of 40 percent formaldehyde.—Spraying seed-bed and seedlings with Bordeaux mixture is not effective.—Removal of diseased host tissue with a fine screen prevents infection in the seed-bed.—Covering badly diseased host tissue with 4 inches or more of uncontaminated soil yields diseased-free seedlings.—Removal of diseased plants and deep, fall plowing suggested for control in field.

317. **Hoffer, G. N., and J. R. Holbert,** Results of corn disease investigations. Science **47**: 246–247. 1918.—Occurrence of barren stalks and stalks bearing only nubbins is correlated with certain pathological conditions in the plants. In corn grown from ears which presented this pathological condition in seedlings, 15 percent of plants were barren compared with 6 percent from ears not revealing this condition.—Diseased seedlings develop from seeds disinfected externally and grown in flasks of sterilized agar. Bacteria appear which rot seedling root tips. Species of Fusarium also appear. Selfed plants from disease-free seedlings gave only 1.5 percent barren plants.—All kernels on any one ear are not infected internally.

318. **Holton, John C.,** The theory and practice of sanitary precautions in grove and packing house operations. Florida State Plant Bd. Quart. Bull. **2**: 161–179. 1918.—50 percent of the citrus packing house operators followed regulations of the Board.—Data on practical operation of application of sanitary measures in packing house operations.

319. **Holway, E. W. D.,** Infected grass seeds and subsequent rust development. Phytopath. **8**: 169. 1918.—Quotation from McAlpine, the Rusts of Australia. *Puccinia beckmanniæ* developed in Australia on plants grown from seeds of *Beckmannia erucæformis* Host. sent there from U. S. A. In the same way *Puccinia impatientis* was carried with seeds of *Elymus condensatus*.

320. **Hungerford, Chas. W.,** Field conference of cereal pathologists. Science **48**: 148–150. Aug. 9, 1918.—Brief summary reports of progress on investigations by various workers and discussions of methods of control of cereal diseases. The following subjects are considered: Barberry eradication, stem rust (*P. graminis*), leaf rust (*P. triticina*), bacterial diseases of cereals, smuts, smut eradication, seed treatment methods. Resolutions were adopted (1) endorsing the barberry eradication campaign as a means of reducing the amount of stem rust and (2) recommending to the Federal Horticultural Board the use of proper precautions to prevent the possible introduction of certain wheat diseases on grain from Australia.

321. **Jones, L. R.,** Disease resistance in cabbage. Nat. Acad. Sci. Proc. **4**: 42–46. 1918. —Jones reports that by selecting fifty individual cabbage plants which were most resistant to the attacks of *Fusarium conglutinans* as judged by their behavior on "cabbage sick" soil in 1910, he was able to obtain, in the second generation, from these, individual strains which are highly resistant and of commercial value. His results show that the disease resistant character is fixed and heritable. Better resistance was obtained in the second than in the first generation from selected individuals. The variation in susceptibility shown by individuals of the second generation suggests that further improvement may be possible through continued selection.—The author comments on the work of W. H. Tisdale which seems to show that the parasite invades root tissues of resistant cabbages more slowly than in the case of susceptible plants. He also refers to the experiments of J. C. Gilman which indicate that under 17°C. the fungus is not able to attack the most susceptible plants.—L. O. Kunkel.

322. **Jones, L. R., and W. W. Gilbert,** Lightning injury to herbaceous plants. Phytopath. **8**: 270–280. *8 fig.* 1918.—A record of observations by the authors and others of the effect of strokes of lightning on potato, cotton, tobacco, cucumber and tomato. Killed

areas vary in diameter from 10 to 30 feet and are roughly circular in outline. There is usually a marginal band of partially killed plants. The greatest damage seems to occur when the stroke occurs soon after rain begins and the explanation is offered that moist surface soil, underlaid by dry soil, would favor wider diffusion of the shock. The balance of evidence is in favor of the conclusion that certain herbaceous crops, e.g., potatoes, sugar heets and cotton, suffer more regularly and seriously from lightning stroke than others, e.g., cereal and forage crops.

323. **Lewis, A. C.,** Facts of interest about the Georgia State Board of Entomology. Georgia State Bd. Ent. Circ. 28: 1–12. 1918.—Popular account of work in the control of diseases and insects.

324. **Long, W. H., and R. M. Harsch,** Aecial stage of Puccinia oxalidis. Bot. Gaz. 65: 475–478. May, 1918.—An undescribed *Aecium* on *Berberis repens* near Albuquerque, New Mexico, was found in close association with *Oxalis violacea* upon which occurred urediniospores of *Puccinia oxalidis*. Field and laboratory experiments proved the relation between the two. *Puccinia oxalidis* therefore has its pycnia and aecia on *Berberis repens* while uredinia and telia occur on *Oxalis violacea* and other species.—H. W. ANDERSON.

325. **Long, W. H., and R. M. Harsch,** Pure cultures of wood-rotting fungi on artificial media. Jour. Agric. Res. 12: 33–82. 1918.—Cultures of hymenomycetes were grown on plant infusion agar media. The color of the submerged mycelium, the color and general appearance of the aerial mycelium, and certain other characters, were found to have diagnostic value. Some of the vegetative cultural characters of several polypores are shown in tabular form to illustrate the information which the behavior of artificial cultures may give as to the relationships of fungi from different sources. Characters of artificial cultures are especially valuable for the identification of the causal organisms in decayed wood on which no sporophores have been formed.

The production of sporophores in artificial culture gives additional data for identification. While the writers were unable to secure any entirely typical pilei, forty-two species, representing four different hymenomycetous families, were induced to form sporophores on nutrient agar in 20 mm. tubes. Carrot, malt, and parsnip agars were found best adapted for this phase of the work. Rather strong light proved especially favorable to sporophore production although three species were induced to fruit in darkness. The position of the pileus was determined by the direction of the source of light, while gravity was the determining factor in the position of pores. The use of small fragments of sporophore in inoculating the agar resulted in especially prompt formation of sporophores. It also resulted in sporophore production on media on which none were produced following inoculation with spores or mycelium.—CARL HARTLEY.

326. **Lyman, G. R.,** The relation of phytopathologists to plant disease survey work. Phytopath. 8: 219–228. 1918.—A description of the scope, operation and aims of the federal plant disease survey, or intelligence service, and a plea for coöperative endeavor.

327. **Lyman, George Richard,** Plant disease survey work on the Physoderma disease of maize. Journ. Wash. Acad. Sci. 8: 43–44. Jan. 19, 1918.—Abstract of paper read before the Botanical Society of Washington, Nov. 6, 1917.

328. **MacInnes, F. J.,** The occurrence of Alternaria in a characteristic apple spot and an apple rot caused by Gliocladium viride. Trans. Illinois Acad. Sci. 10: 218–229. *Pl. I–IV*. (1917) 1918.—An Alternaria was found associated with a peculiar lesion on a number of apples obtained from an orchard near Harristown, Illinois. The spots vary from 2 mm. to 3 cm. in diameter and penetrate the flesh only to a depth of about 2 mm. No inoculation studies are reported.—A fungus found in plates made from rotting apples and determined by Dr. Chas. Thom to be *Gliocladium viride* was found to cause a soft rot when inoculated into ripe apples. —H. W. ANDERSON.

329. **Martin, W. H.,** Dissemination of Septoria lycopersici Speg. by insects and pickers. Phytopath. **8**: 365–372. 1918.—After the diseases appear in the field insects captured either on diseased or healthy plants are shown to carry, in large numbers, spores of *Septoria lycopersici* and of *Alternaria solani*. The insects examined were *Leptinotarsa decemlineata* larvae and adults, and *Protoparce carolina*.—Insect excreta removed from healthy plants was examined and spores of the two organisms found in small numbers, some of them germinating. Experiments in moist chambers confirm the results of field tests.—Spores of these two parasites were found abundantly on the hands and garments of pickers and it is believed that epiphytoties are brought about through this agency.

330. **Martin, George W.,** Brown blotch of the Kieffer pear. Phytopath. **8**: 234–239. *f. 1–8.* 1918.—The lesions are superficial and at first circular with indefinite margins. By fusion large irregular blotches, covering a part or all of the fruit, are formed. They resemble the natural russet coat of certain varieties. A fungus, closely related to *Leptothyrium pomi,* is said to cause the disease. The mycelium and sclerotia, however, are not superficial but are imbedded in the cutin and cause excessive suberization and hypertrophy of subcuticular layers of the fruit. The disease is best controlled by two late (July and August) treatments of Bordeaux mixture.

331. **Matz, J.,** Diseases and insect pests of the pecan. Florida Agric. Exp. Sta. Bull. 147: 135–162. 1918. (Part I.—Diseases, p. 135–150.) A compilation on several common pecan diseases, with special attention to symptoms and control measures.—L. R. Hesler.

332. **Matz, J.,** Report of laboratory assistant in plant pathology. Florida Agric. Exp. Sta. Rept. **1917**: 87R–94R. 1918.—Two pecan diseases are discussed, dieback, which is evidently due to *Botryosphæria berengeriana,* and a leaf spot, proved to be caused by an undescribed species of Gnomonia.—L. R. Hesler.

333. **Matz, J.,** A method for making permanent mounts of entire colonies of some fungi in plate cultures. Phytopath. **8**: 446–447. 1918.—A thin film of medium is used. Organism is allowed to spread over medium and up the side of the plate. The medium is allowed to dry out and is then dissolved away with boiling water. The mycelium remaining is dehydrated with alcohol and may be stained if desired.

334. **McClintock J. A.,** Further evidence relative to the varietal resistance of peanuts to Sclerotium rolfsii. Science **47**: 72–73. 1918.—Variety "Virginia bunch" is susceptible, variety "Virginia runner" practically immune.

335. **McCubbin, W. A.,** Public school survey for currant rust. Phytopath. **8**: 294–297. 1918.—The machinery of the public school system was employed to make a survey for the currant rust, *Cronartium ribicola*. Form letters are reproduced. Comparison of effectiveness of survey by school children and by professional scouts indicates that the former is much more effective.

336. **McCulloch, Lucia,** A morphological and cultural note on the organism causing Stewart's disease of sweet corn. Phytopath. **8**: 440–442. *Pl. 1.* 1918.—Organism is without flagella and is referred to as *Aplanobacter Stewarti*.—Organism produces two distinct types of surface colonies on peptonized beef agar plates. One has a smooth flat surface, the other a definite central depression. No other known difference exists. All the colonies of any one isolation are of the same type.

337. **Miles, L. E.,** Some new Porto Rican fungi. Trans. Ill. Acad. Sci. **10**: 249–255. *fig. 1–3.* (1917) 1918.—Nine new species of Mycosphaerella and one each of Helminthosporium and Cercospora are described.—H. W. Anderson.

338. **Miller, F. H.,** Disease control and forest management. Jour. Forestry **15**: 974–977. 1918.—The author discusses briefly the effect of forest tree diseases upon forest management. "The combining of disease control with intensive forest management calls for an adjustment

of the rotation, cutting cycle, and marking rules in such ways as, in the case of enphytotics, to control the disease by measures of sanitation, and by limiting the felling age so that loss is minimized; and in the case of epiphytotics, to make 'sanitation' cuttings, or damage cuttings, or both, and employ certain silvicultural measures, such as the substitution of other species which are more resistant or immune." An example is given of a working plan for a forest in Saratoga Co., New York, which takes into account the chestnut blight and apparently the white pine blister rust. The paper is largely based on previous papers by Meinecke and by Recknagel.—HAVEN METCALF.

339. **Murphy, Paul A., and E. J. Wortley,** Determination of the factors inducing leafroll of potatoes particularly in northern climates. First progress report. Phytopath. **8**: 150–154. 1918.—The work shows that healthy plants grown in rows and separated from diseased hills by 30 inches only, developed the disease to the extent of 89.5, 50, and 19.4 per cent, respectively. The probability of the spread of the disease from certain centers has endangered the safety of hill selection and to eliminate the danger from infection, it is advised that in experiments the rows be at least six feet apart.—ERNST ARTSCHWAGER.

340. **O'Gara, P. J.,** The white-spot disease of alfalfa. Science **48**: 299–301. 1918.—Disease is found to be prevalent and troublesome in the western States. Basing statement on data which are not presented author concludes that the spots are due to a disturbance of physiologic balance between water absorption and transpiration.—C. T. GREGORY.

341. **Osner, Geo. A.,** Additions to the list of plant diseases of economic importance in Indiana. Proc. Indiana Acad. Sci. **1916**: 327–332. (1917) 1918.—A record of fifty-three diseases of cultivated plants not previously reported from Indiana. [Supplementary to: Pipal, F. J., A List of Plant Diseases of Economic Importance in Indiana. Proc. Indiana Acad. Sci. *1915: 379–413. 1916.*]—H. S. JACKSON.

342. **Parker, J. H.,** Greenhouse experiments on the rust resistance of oat varieties. U. S. Dept. Agric. Bull. 629: 1–15. *pl. 1–2, f. 2.* 1918.—Tests of the resistance of oat varieties to crown rust (*Puccinia lolii avenæ* McAlpine) and stem rust (*Puccinia graminis avenæ* Erikss. and Henn.). Both of these rusts are widely distributed in the United States but stem rust causes the greater loss in the northern states while crown rust does more damage in the South. Resistance is judged by length of incubation period, formation of flecks or large dead areas, small uredinia, small number of uredinia and in the case of crown rust the production of normal telia on the seedling leaves. Of 122 varieties tested, 80 showed no resistance to either rust. 16 out of 23 varieties belonging to the red oat group showed some resistance to crown rust. Several varieties of this group were very susceptible to crown rust and all were susceptible to the stem rust. White Tartarian and Ruakura were the only varieties showing any resistance to stem rust.—L. O. KUNKEL.

343. ***Peltier, George L. and David C. Neal,*** *A convenient* heating and sterilizing outfit for a field laboratory. Phytopath. **8**: 436–438. *2 fig.* 1918.—Small autoclave now on market for home canning purposes is heated with a blue flame gasoline burner.

344. **Perrine, W. S.,** Adjusting the spray schedule on certain varieties of apples. Trans. Illinois Hort. Soc. **51**: 388–398. (1917) 1918.—Each variety of apple varies in its relative susceptibility to blotch, scab, and codling moth. Some varieties are seriously injured by spray mixtures that cause no damage to others. On this account it is shown that it pays to consider the varieties individually in spraying. Schedule for Transparent, Duchess, Grimes, Jonathan, Chenango, York Imperial, Benoni, and Ben Davis are discussed.—H. W. ANDERSON.

345. **Perrine, W. S.,** Orchard spraying. Trans. Illinois Hort. Soc. **51**: 265–274. (1917) 1918.—A discussion of apple spraying from the standpoint of the practical orchardist.—H. W. ANDERSON.

346. Pickett, B. S., Spraying apples. Trans. Ill. Hort. Soc. **51**: 328–338. (1917) 1918.—The fundamental principles of spraying are discussed.—H. W. Anderson.

347. Pickett, B. S., O. S. Watkins, W. A. Ruth and A. J. Gunderson, Field experiments in spraying apple orchards in 1913 and 1914. Illinois Agric. Exp. Sta. Bull. **206**: 427–509. *f. 1–6.* Apr., 1918.—A detailed account is given of spraying experiments at Neoga, Flora and Griggsville. The financial gain through spraying is demonstrated. Lime-sulfur solution proved to be better than Bordeaux mixture as a spray on account of the foliage and fruit injured by the latter. A number of brands of arsenate of lead were tested, demonstrating that all the standard brands are about equally effective. New and proprietary fungicides were shown to cost more and as a rule were less effective than known standard mixtures. It was demonstrated that high pressures give more effective control than low pressures and do not cause injury where the quantity of spray applied is controlled. The authors recommend the use of lime-sulfur solution for the cluster bud, calyx and other sprays applied in May or during cool weather in June but recommend Bordeaux mixture for hot weather in June and during remainder of the season. Recommendations based on these experiments are given in the form of a spray schedule.—H. W. Anderson.

348. Pierce, Roy G., Notes on Peridermiums from Ohio: Need of pathological viewpoint in nursery inspections. Phytopath. **8**: 292–294. 1918.—*Peridermium carneum* is reported from various places in Ohio on species of Pinus including *P. austriaca* and *P. laricio*. *Coleosporium vernoniæ*, II, was found later in the year on *Vernonia maxima* in close proximity to one of the diseased pines.—*Peridermium comptoniæ* is reported on two species of Pinus apparently brought in one diseased nursery stock.

349. Pipal, F. J., The effect of hydrogen peroxide in preventing the smut of wheat and oats. Proc. Indiana Acad. Sci. **1916**: 378–381. (1917) 1918.—Hydrogen peroxide reduced percentage of stinking smut of wheat, *Tilletia fœtens*, by about one-half, when diluted one to ten, and about one-third when used full strength. It was partially effective in controlling the oat smuts, *Ustilago avenæ* and *U. lævis*, when diluted 1:15 and 1:10 or when used full strength. Hydrogen peroxide, however, did not compare favorably with the standard formaldehyde treatment.—H. S. Jackson.

350. Potter, Alden A., The effect of disinfection on the germination of cereal seed. Phytopath. **8**: 248–249. 1918.—A critique of methods of sampling based on the idea that the purpose of testing effect of disinfection on germination of seed is to determine what proportion of viable seed contained in original sample has been killed by treatment, and not to discover what proportion of whole lot is viable after treatment.

351. Reddick, Donald, Lightning injury to grape vines. Phytopath. **8**: 298. 1918.—When lightning strikes in a grape trellis varying degrees of injury to the vines result. In the case of light strokes the vines of the trellis may show partial wilting with subsequent recovery or the plants may be killed to the ground, the roots, however, remaining uninjured.

352. Reddick, Donald, Palladin's Plant Physiology. (Review.) Phytopath. **8**: 373. 1918.

353. Reddick, D., Annals of the Phytopathological Society of Japan. (Review.) Phytopath. **8**: 444–445. 1918.

354. Rhodes, Arthur S., Some new or little known hosts for wood-destroying fungi II. Phytopath. **8**: 164–167. 1918. The fungi reported are *Schizophyllum commune* on *Pinus virginiana*, *Pleurotus serotinus* on *Tsuga canadensis*, *Hymenochæte agglutinans* on *Morus rubra* and *Liquidambar styraciflua*, *Stereum* sp. on *Ginko biloba*, *Guepinia spathularia* on *Juniperus virginiana*, *Polyporus dichrous* on *Picea rubens*, *P. obtusus* on *Fagus atropunicea*, *P. versicolor* on *Ginko biloba*, *P. hirsutus* on *Ginko biloba*, *P. pargamenus* on *Pinus virginiana* and *P. gilvus* on *Rhus toxicodendron*.

355. **Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel** and **Carl Hartley,** Host relationships of the North American rusts, other than Gymosporangiums, which attack conifers. Phytopath. **8:** *309–352.* *1918.*—The previously published facts and much new information concerning 52 species (in 14 genera) of the rust fungi are here brought together. The pathological significance of these rusts and other generalizations are made clear in the introduction. Complete information concerning the synonomy, citations to literature, the known hosts and the distribution of each species are given together with a brief summarization of the experimental work establishing the cycle of spore forms. The unconnected aecial forms are treated similarly. A list of the unattached rusts aecia of which are likely to be found on conifers is given. A host index by species for the conifers and by genera for the dicotyledons is given for all the rust fungi included in the paper. A bibliography of 148 titles is appended.—W. H. Rankin.

356. **Rolfs, P. H.,** Citrus diseases. Florida Agric. Exp. Sta. Rept. **1917:** 10R–11R. 1918. —A brief summary of the work performed by the staff in plant pathology. [See Bot. Absts. **1,** 330, 331, 358–360, 368.]

357. **Sharples, A.,** Ustulina zonata (Lev.) Sacc. on Hevea brasiliensis. Ann. Appl. Biol. **4:** 153–178. *Pl. 3–8.* 1918.—Fungus, which is common on felled trunks and stumps of rubber and other soft-wood trees, causes a disease of rubber trees known as collar rot. Disease has been prevalent in F. M. S. since 1912 and is now widespread in old plantations. Injury usually confined to an area at collar but fungus may spread up or down for several feet. Foilage becomes sparse and latex can not be obtained from the side of tree on which lesion occurs.—Shot-hole horer (Xyleborus parvulus) makes infection courts.—Complete description of fungus in all stages, cultural characters, pathological histology and an account of inoculation experiments.—Recommendations for control based on observations and deduction consist essentially of employing sanitary measures.—Paper closes with a strong appeal for coordinated fundamenatal research on the part of the British government, of numerous problems of the rubber industry.

358. **Shear, C. L.,** Pathological aspects of the federal fruit and vegetable inspection service. Phytopath. **8:** 155–160. 1918.—In order to protect and conserve perishable crops to the fullest extent they must be studied in transit and distribution, and a thorough knowledge obtained of the rots and other forms of spoilage which so frequently occur after the product has left the grower. The practical execution of the Food Products Inspection Law of August 10, 1917, is explained and estimates of losses in transit given. The greatest success in carrying out the project can be obtained only by active and sympathetic cooperation of growers, shippers, carriers, distributors, inspectors and pathologists.

359. **Sherbakoff, C. D.,** Report of associate plant pathologist. Florida Agric. Exp. Sta. Rept. **1917:** 76R–86R. 1918.—Chief attention is given to seed-bed diseases of vegetables, tomato buckeye rot and pineapple wilt. It is found that *Rhizoctonia solani* is the most common damping-off fungus. The author concludes that it occurs in new soil and that it is at times introduced into the seed-bed with seed. Similarly *Phomopsis vexans* is carried into the seed-bed with the seed. In the field the latter organism causes an undescribed disease of eggplant called tipover. Preliminary studies on a little-known bacterial spot of pepper are reported. Pink joint, also a disease of pepper, is regarded as possibly due to *Sclerotinia libertiana.* Appended are brief notes on other important diseases of tomato, potato, pepper, celery and watermelon. Progress is reported on pineapple wilt (possibly due to nematodes).—L. R. Hesler.

360. **Sherbakoff, C. D.,** Some important diseases of sweet potato. Florida State Plant Bd. Quart. Bull. **2:** 179–189.—Compiled.

361. **Sherbakoff, C. D.,** Tomato diseases. Florida Agric. Exp. Sta. Bull. **146:** 119–132. *fig. 32–49.* 1918.—Descriptions and illustrations of the diseases of tomatoes occurring in Florida

with recommendations for control. Causal organisms not mentioned except in names of the diseases. Diseases discussed are: bacterial blight, septorial blight, sclerotial blight, Phytophthora blight, fusarial blight, macrosporial blight, Phoma spot, buckeye rot (*Phytophthora terrestria*), brown rot (*Rhizoctonia solani*), bacterial soft rot, blossom-end rot, root knot.—I. C. JAGGER.

362. **Smith, Erwin F., and G. H. Godfrey,** Brown rot of Solanaceæ on Ricinus. Science **48**: 42–43. 12 July, 1918.—*Bacterium solanacearum* attacks the castor oil plant (*Ricinus communis*) in various stages of growth producing a wilt. Evidence is presented to prove the identity of the organism. Land on which any of the common solanaceous plants have wilted should not be planted to Ricinus.

363. **Smith, Ralph E.,** The beet leafhopper and the curly-leaf disease that it transmits. [Review of Utah Agric. Exp. Sta. Bull. 155.] Phytopath. **8**: 168. 1918.

364. **Spaulding, Perley,** Some biological aspects of the spread of the white pine blister rust. Jour. Washington Acad. Sci. **8**: 40–41. 19 Ja 1918.—Abstract of paper read before Biological Society of Washington, Nov. 17, 1917.

365. **Stakman, E. C., and C. R. Hoerner,** The occurrence of Puccinia graminis tritici-compacti in the southern United States. Phytopath. **8**: 141–149. 1918.—The biologic form of *Puccinia graminis tritici*. has been found in the states of Washington, Oregon, Alabama, Louisiana, south-eastern Texas, and possibly Virginia.

Extensive infection experiments demonstrate that the southern and northern strains of *Puccinia graminis tritici-compacti* are the same. The difference between this form and *P. graminis tritici* is constant, not a local variation. In the majority of the varieties and species of wheat tested there is evident a very decided difference in the pathogenicity of the two biologic forms. The varieties which are susceptible to *P. graminis tritici* are usually resistant to *tritici-compacti*. There are indications that resistance to *tritici-compacti* varies directly with the hardness of the wheat. Note is made of the fact that the southern wheats are largely soft whereas the northern spring wheats are hard. This may have especial significance in epiphytology studies.—Morphologically the spores of *tritici-compacti* are distinctly different from those of *P. graminis tritici* and can be readily distinguished by measurement. —The suggestion is made that the *tritici-compacti* form of *P. graminis* is present in the south whereas *P. graminis* is prevalent in the north. This may be evidence that the south to north dissemination of this fungus does not occur.—C. T. GREGORY.

366. **Stevens, F. L.** Porto Rican fungi, old and new. Trans. Illinois Acad. Sci. **10**: 162–218. *figs*. 1–13. (1917) 1918.

367. **Stevens, F. L., and H. W. Anderson,** Protect the wheat crop. Eradicate the common barberry from Illinois. Univ. Illinois Col. Agric. Extension Circ. 22: 1–4. *f. 3*. 1918.

368. **Stevens, H. E.,** Lightning injury to citrus trees in Florida. Phytopath. **8**: 283–285. 1 *fig*. 1918.—Injury is of fairly frequent occurrence and not confined to any one region. From a few to thirty trees may be injured at one stroke. When the trunk is struck the injury is represented by a narrow strip of dead bark, 1 to 5 cm. or more in width, extending downward to the surface of the soil. At the base of the trunk the injured area may extend to completely girdle the tree. The tissue is killed down to the hardened xylem.

Usually one or two trees are severly injured or killed. Adjacent trees show injury on scattered twigs and branches where characteristic spots or blotches are produced. The spots are greenish-yellow and vary in size and shape. They may involve a few square millimeters or may extend 10 cm. and envelop the twig. Usually the injured areas are superficial. Injured areas are usually invaded by fungi.

369. **Stevens, H. E.,** Report of plant pathologist. Florida Agric. Exp. Sta. Rept. **1917**: 66R–75R. 1918.—The report covers citrus diseases. The cause of gummosis remains un-

solved. Young lesions yield no organisms although *Phomopsis citri*, *Diplodia natalensis* and several other organisms are associated with older spots. Inoculation experiments were unsatisfactory. Pruning offers promise for the control of melanose. Tests show that the citrus canker organism (*Ps. citri*) not only survived 26 months in relatively dry soil but retained its pathogenicity. Studies indicate that *Phytophthora terrestria* may cause foot rot. Brief notes are given on anthracnose, withertip, scab and an apparently new fruit spot.—L. R. Hesler.

370. **Stewart, V. B.**, Exclusion legislation and fruit tree production. Phytopath. **8**: 160–164. 1918.—It appears unwise to prohibit importation of living plants when such plants can not be produced successfully at home. Attempts in U. S. A. to grow many kinds of fruit tree seedlings have usually resulted in plants inferior to foreign-grown stock. American growers of seedling stock are largely dependent on imported seed.—Crown gall caused by *Bacterium tumefaciens* has proved a limiting factor in seedling production in American nurseries.—It is questioned whether prohibition of importation is necessary at the present time, the contention being that all the important diseases and pests of nursery stock have been brought in repeatedly during the long period of free intercourse.

371. **Stone, R. E.**, Incubation period of Cronartium ribicola on the white pine. Phytopath. **8**: 438–440. *Fig*. 1. 1918.—In 70 percent of the cases examined the period of incubation could not have been longer than 2 years and 10 months. In the remaining cases the period may have been a year longer.

372. **Tanaka, Tyôzaburô**, Citrus canker in Japan: A translation of the first description of this disease, from the Japanese. Phytopath. **8**: 443–444. 1918.—Original article by Kumanosuke, Abe, A new kind of pathogenic microbe: being No. 8 of the organisms injurious to citrus. Nippon no Mikan **37**: 162–165. 1904.

373. **Thomas, H. E.**, Cultures of Æcidium tubulosum and A. passifloriicola. Phytopath. **8**: 163–164. 1918.—Cultural proof of the connection of *Æcidium tubulosum* Pat. & Gaill. on *Solanum torvum* Sw. with *Puccinia substriata* Ell. & Barth. on *Paspalum paniculatum* and of *Æcidium passifloriicola* P. Henn. on *Passiflora rubra* with *Puccinia scleriæ* (Pas.) Arth. on *Scleria pterota*.

374. **Turner, William F.**, Nezara viridula and kernel spot of pecan. Science **47**: 490–491. 1918.—In Georgia, *Nezara viridula* attacks the cow pea by preference but when this host, which is used as a soiling crop in orchards, begins to dry the insects collect on the pecan. A severe infestation of insect in 1916 was coincident with an epiphytotic of kernel spot. The data show that the insect is an important agent either in the production of the disease or a carrier of *Coniothyrium caryogenum* to which Rand has attributed the disease.

375. **Weir, James R.**, Effects of mistletoe on young conifers. Jour. Agric. Res. **12**: 715–718.—The paper deals with the early stages of the effect of leafless mistletoes on young conifers. Measurements and photographs are given of young pines infected with *Razoumofskya campylopoda*, and of *Pseudotsuga taxifolia* infected with *R. douglasii*. Both height growth, and for the latter host size of buds, is found to be less in selected infected trees than in vigorous uninfected trees of the same average age. Evidence is presented bearing on storage of food materials in the witches'-brooms resulting from mistletoe attack on pine and larch.—Trees infected when young rarely produce merchantable timber. The killing of old infected trees and the choice of uninfected sites for forest plantations are recommended to insure against infection of young stands.—Carl Hartley.

376. **Weston, William H.**, The downy mildews of maize, their origin and distribution. Jour. Washington Acad. Sci. **8**: 43. Jan. 19, 1918.—Abstract of paper read before Botanical Society of Washington, Nov. 6, 1917.

377. **Whetzel, Herbert Hice,** An outline of the history of phytopathology. *130 p., 22 portraits.* W. B. Saunders Co., Philadelphia, 1918.

378. **Worsham, E. Lee,** Twentieth annual report of the State Entomologist for 1917. Georgia State Bd. Ent. Bull. 51: 1–44. 1918.—Cotton anthracnose was reduced by the use of seed selected from disease-free bolls. Treatment of infected seed with mercuric chlorid or sulfuric acid for 1 hour gave no result.—Practical control of angular leaf spot of cotton was secured by using seed two years old and also by treating seed 1 year old with mercuric chlorid or sulfuric acid for 1 hour.—88,000 inspections were made for citrus canker and 7 diseased trees found—The use of a dust mixture containing 90 percent sulfur did not give as good control of bitter rot of apples (Glomerella) as did bordeaux mixture. Varieties Winesap and Gano are susceptible to bitter rot, Yates and Terry Winter are practically immune.—Miscellaneous notes on diseases and insects of peaches, pecans, tomatoes, peppers and other truck crops.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor.*

[Unsigned abstracts are by the editor.]

BRYOPHYTES

379. **Hurst, C. P.,** East Wiltshire mosses and hepatics. Jour. Bot. 56: 181–186. 1918.—The author gives a list of species with notes; no new species or combinations are published.

ALGAE

380. **Cleland, Ralph E.,** Notes from the Woods Hole Laboratory—1917. II. A new Erythrotrichia from Woods Hole. Rhodora 20: 144–145. *Pl. 124.* 1918. [Edited by F. S. Collins.]—The new species, *E. rhizoidea,* growing on *Porphyra umbilicalis,* is described from Woods Hole Harbor, Massachusetts.

381. **Collins, F. S.,** Notes from the Woods Hole Laboratory—1917. I. Species new to science or to the region. Rhodora 20: 141–143. *Pl. 124.* 1918.—A new species each of *Microchaete* and *Bulbochaete* are described. *Bulbochaete elatior* Prings. and *Mikrosyphar Porphyrae* Kuckuck are reported for the first time from America. *Chroococcus limneticus* Lem. and *Nostoc punctiforme* Hariot ex Bor. & Flah. are recorded as new for the Woods Hole, Massachusetts, region.

382. **Hornby, A. J. W.,** A new British fresh water alga. New Phytol. 17: 41–43. *Fig. 1–4.* 1918.—A new species of Endoderma, *E. Cladophorae,* is described. The alga, occurring principally on Cladophora—rarely on *Rhizoclonium hieroglyphicum,* is at first strictly epiphytic, but later penetrates the lamellae of the host cell wall, resulting in a thallus two or three cells in thickness completely encircling the host filament.

383. **West, G. S.,** A new species of Gongrosira. Jour. Roy Microsc. Soc. 1918: 30–31. *1 pl.* 1918.—*Gongrosira scourfieldii,* a new lime-incrusted species of the genus, is described from Sidmouth, Devonshire.

FUNGI

384. **Arthur, J. C.,** Uredinales of Costa Rica based on collections by E. W. D. Holway. Mycologia 10: 111–154. 1918.—There are listed here 118 rusts. The following are described as new: Uromyces (4 species), Uredo (3 species), Ravenelia (1 species), Puccinia (14 species), Aecidium (3 species). No new genera are proposed.—H. M. Fitzpatrick.

385. **Arthur, J. C.**, Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. Bot. Gaz. 65: 460–474. 1918.—Critical notes on twenty-five species included in nine genera are given. *Puccinia Lagerheimiana* Diet. is transferred to a new genus, Cleptomyces. The telial stages of *Uredo Bambusarum* P. Henn. and *Uredo Mogiphanis* Juel are described and the species transferred to Puccinia. Descriptions of one new species of Uropyxis and one of Sphenospora by G. Lagerheim are included. The author also describes five new species of Puccinia and one of Aecidium.—H. S. Jackson.

386. **Arthur, J. C.**, New species of Uredineae—X. Bull. Torr. Bot. Club 45: 141–156. 1918.—The author describes eight new species of Puccinia, two of Uromyces, ten of Aecidium, and three of Uredo, all from North America. The telial stages of *Aecidium Atriplicis* Shear and of *Uredo Heliconiae* Diet. are also described and the species transferred to the genera Uromyces and Puccinia respectively.

387. **Arthur, J. C., and G. R. Bisby**, An annotated translation of the part of Schweinitz's two papers giving the rusts of North America. Proc. Amer. Phil. Soc. 57: 173–292. 1918.—An extensive introduction includes a large amount of interesting information concerning the life of Schweinitz, his methods of work, and his herbarium which is now deposited in the rooms of the Academy of Natural Science of Philadelphia. An English translation of the remarks of Schweinitz on the rusts of North America in his two well known papers, is accompanied by many explanatory notes supplied by the authors and based on the critical examination of the specimens as they now exist in the herbarium. These notes are made in the attempt to verify certain of Schweinitz's statements, and to explain douhtful points. A complete list of all the Uredinales described by Schweinitz is given in chronological order. Another list shows the same species arranged according to modern conceptions of classification. Synonyms are cited in most cases. The paper renders available to students of the rusts many facts hitherto unavailable concerning the type specimens of North American Uredinales described by Schweinitz.—H. M. Fitzpatrick.

388. **Arthur, J. C., and J. R. Johnston**, Uredinales of Cuba. Mem. Torr. Bot. Club 17: 97–175. *1 pl.* 1918.—The authors give an extensive historical account of the various rust collections which have been made in Cuba, followed by an enumeration, with notes, of all species (140 in number) which the various collections have thus far brought to light. New species are described of the following genera: Cronartium, 1; Cionothrix, 1; Ravenelia, 1 (on basis of uredinia alone); Puccinia, 3 (the type material of one of these, *P. fuscella*, was issued as No. 772 in Bartholomew's North American Uredinales' under the name *P. Vernoniae*); Aecidium, 2; Uredo, 3; Uromycladium, 1 (doubtfully). The telial stages of *Uredo notata* Arth., *U. Anthephorae* Sydow, *U. Gouaniae* Ellis & Kelsey, and *U. cristata* Speg. are described and the species published respectively under the new combinations and names *Cronartium notatum, Puccinia Anthephorae, Puccinia invaginata*, and *Uromyces Cupaniae*.

Puccinia macropoda Speg. (*Uredo striolata* Speg.) is published under the new combination *P. striolata*; *Allodus megalospora* Orton appears under the new combination *Puccinia megalospora*; and *P. aequinoctialis* Holw. (*Uredo Adenocalymnatis* P. Henn.) is published under the new combination *P. Adenocalymnatis*. A host index as well as an index to the species of Uredinales is appended.

389. **Atkinson, G. F.**, Six misunderstood species of Amanita. Mem. Torr. Bot. Club 17: 246–252. 1918.—Critical notes on some species which according to the author have been misunderstood in recent American publications on the genus.

390. **Boyce, J. S.**, Perennial mycelium of Gymnosporangium blasdaleanum. Phytopath. 8: 161–162. 1918.—See Entry 289.

391. **Brandes, E. W.**, Anthracnose of lettuce caused by *Marssonina panattoniae*. Jour. Agric. Res. 13: 261–280. *Pl. C and 20.* 1918.—This name is merely a new combination applied by Magnus to the fungus commonly known in America as *Marssonia perforans*. The

name Marssonia is preoccupied by a Phanerogamic genus. The synonomy for this species is given here.—H. M. FITZPATRICK.

392. **Brenckle, J. F.,** North Dakota Fungi—II. Mycologia **10**: 199–221. 1918.—This list covers the basidiomycetes and fungi imperfecti. *Hendersonia Crataegi* on *Crataegus mollis* is described as new.—H. M. FITZPATRICK.

393. **Burlingham, Gertrude S.,** New species of Russula from Massachusetts. Mycologia **10**: 93–96. 1918.—Four new species are described. These are *R. Davisii*, *R. disparalis*, *R. pulchra*, and *R. perplexa*.—H. M. FITZPATRICK.

394. **Burlingham, Gertrude S.,** A preliminary report on the Russulae of Long Island. Mem. Torr. Bot. Club **17**: 301–306. 1918.—A list, with notes, of twenty-two American and fourteen European species of Russula occurring on Long Island, New York.

395. **Burt, E. A.,** Corticiums causing Pellicularia disease of the coffee plant, Hypochnose of pomaceous fruits, and Rhizoctonia disease. Ann. Missouri Bot. Gard. **5**: 119–132. *Fig. 1–3*. 1918.—The description of *Corticium koleroga* (Cooke) v. Höhn. is slightly broadened on the basis of specimens now known from widely separated regions. *Hypochnus ochroleucus* Noack is transferred to Corticium and published under the name *C. Stevensii*. Descriptions, synonomy, distribution, and critical notes are given for both species as well as for *C. vagum* Berk. & Curtis.

396. **Carpenter, C. W.,** Wilt diseases of okra and the Verticillium wilt problem. Jour. Agric. Res. **12**: 529–546. *Pl. A and 17–27*. 1918.—A comparative study of *Verticillium albo-atrum* in moist and dry air demonstrates that the type of conidium formation is not a sound basis for separation of the genera *Verticillium* and *Acrostalagmus*. The conidia of this species in moist air are held together in a spherical head of hygroscopic slime, as described for species of *Acrostalagmus*. Attention is called to the earlier work of Reinke and Berthold, recently generally overlooked, in which *Acrostalagmus* Corda is united with the older genus *Verticillium* Nees. Cross inoculations show that *Verticillium albo-atrum* causes a wilt disease of okra, snapdragon, eggplant, potato, cotton, *Xanthium spp.*, and *Abutilon spp.* The suggestion is made that *Acrostalagmus albus*, *A. panax*, *A. caulophagus*, *A. vilmorinii*, and *V. dahliae* are all probably identical with *V. albo-atrum*, since in culture these fungi are not to be distinguished.—H. M. FITZPATRICK.

397. **Coker, W. C.,** The Lactarias of North Carolina. Proc. Elisha Mitchell Sci. Soc. **34**: 1–61. *Pl. 1–40*. 1918.—Fifty species and forms of Lactaria are listed, accompanied by descriptions and copious notes, and, in most cases, by full-page half-tone reproductions of photographs made by the author. Seven new species and a new form ("Form A") of each of three previously recognized species are described. A key to species is given.

398. **Davis, J. J.,** Tilletia on wheat in North Dakota. Phytopath. **8**: 247. 1918.—Brenckle's Fungi Dakotenses No. 132 labeled *Tilletia tritici* is here stated to be *T. laevis*.—H. M. FITZPATRICK.

399. **Dodge, B. O.,** Studies in the genus Gymnosporangium—II. Report on cultures made in 1915 and 1916. Bull. Torr. Bot. Club **45**: 287–300. *Pl. 8*. 1918.—Inoculations with *Gymnosporangium clavipes*, *G. macropus*, *G. globosum*, *G. Ellisii*, *G. clavariaeforme*, *G. juvenescens*, *G. nidus-avis*, *G. transformans*, and *G. fraternum* are discussed and the results tabulated.—H. M. FITZPATRICK.

400. **Dodge, B. O., and J. F. Adams,** Some observations on the development of *Peridermium cerebrum*. Mem. Torr. Bot. Club **17**: 253–261. *Pl. 4–6. f. 1–3*. 1918.

401. **Douglas, Gertrude E.,** The development of some exogenous species of Agarics. Amer. Jour. Bot. 5: 36–54. *Pl. 1–7.* 1918.—*Mycena subalkalina* Atkinson, occurring on decaying wood in the vicinity of Ithaca, New York, is incidentally described as a new species.—See Entry 65.

402. **Enlows, Ella M. A.,** A leafblight of Kalmia latifolia. Jour. Agric. Res. *13*: 199–212. *Pl. 14–17.* 1918.—The pycnidial stage of the causal organism is described under the name *Phomopsis Kalmiae* n. sp. The attempts to find an ascigerous stage were unsuccessful.—H. M. FITZPATRICK.

403. **Fairman, Charles E.,** Notes on new species of fungi from various localities—II. Mycologia 10:164–167. 1918.—The following new species are described: *Phoma verbascicarpa* on *Verbascum Blattaria, Phomopsis ericaceana* on *Azalea mollis, Sphaeropsis wistariana* on *Wistaria* (cult.), *Sphaeropsis Diervillae* on *Diervilla Diervilla, Camarosporium wistarianum* on *Wistaria* (cult.), *Rhabdospora translucens* on *Tecoma radicans Microdiplodia Diervillae* on *Diervilla Diervilla, Hendersonia hortilecta* on *Clematis paniculata, Dictyochora Gambellii* on *Zea mays, Platystomum phyllogenum* on *Anastraphia Northrupiana.* The last named species was collected in Cuba, the others in New York.—H. M. FITZPATRICK.

404. **Faulwetter, R. C.,** The Alternaria leaf-spot of cotton. Phytopath. 8:98–105. *Fig. 1–3.* 1918.—*Alternaria tenuis* Nees or a closely related species. See Entry 96.—H. M. FITZPATRICK.

405. **Fitzpatrick, Harry M.,** The life history and parasitism of *Eocronartium muscicola.* Phytopath. 8: 197–218. *Pl. 1, f. 1–7.* 1918.—*Typhula muscicola Fr., Clavaria muscigena Karsten,* and *Eocronartium typhuloides* Atkinson are shown to be identical. The fungus takes, therefore, the older specific name *muscicola. Clavaria uncialis* Grev. is found not to be identical with *Clavaria muscigena* as believed by Karsten. All the known hosts of *Eocronartium muscicola* are listed. A review is given of what is known of the parasitic Auriculariaceae. See Entry 306.—H. M. FITZPATRICK.

406. **Godfrey, G. H.,** *Sclerotium rolfsii* on wheat. Phytopath. *8*: 64–66. *Fig. 1.* 1918.

407. **Graff, P. W.,** Philippine micromycetous fungi. Mem. Torr. Bot. Club 17: 56–73. 1918.—The author describes one new species each of Ascophanus, Meliola, Phyllosticta, and Actinothyrium. In addition, fifty-two previously recognized species are listed with notes and principal synonomy. All the species reported are from the island of Luzon.

408. **Harper, Ed. T.,** The Clavaria fistulosa group. Mycologia 10: 53–57. *Pl. 3–5.* 1918. —The following species are figured and discussed: *C. ardenia, C. fistulosa, C. macrorrhiza, C. contorta, C. juncea.*—H. M. FITZPATRICK.

409. **Harter, L. L.,** A hitherto-unreported disease of okra. Jour. Agric. Res. 14: 207–212. *Pl. 23.* 1918.—The causal organism occurs on the stems and pods, and has been found on plants in Maryland and New York. It is here named *Ascochyta abelmoschi* n. sp., on account of its production of a large percentage of 1-septate spores. The examination of type material of *Phoma okra* Cke., and of two other collections of this species made by Langlois showed no septate spores.—H. M. FITZPATRICK.

410. **Hedgcock, Geo. G., E. Bethel** and **N. Rex Hunt,** Notes on some western Uredineae. Phytopath. 8: 73–74. 1918.—The spermagonia of *Peridermium pyriforme* and *P. filamentosum* are borne on the bark of the host in newly invaded areas one year preceding the appearance of the aecidia. *Peridermium filamentosum* and *P. harknessi* are regarded as probably distinct species although they both have their uredo and teleuto stages on *Castilleja* (*Cronartium coleosporoides*).—H. M. FITZPATRICK.

411. Hedgcock, Geo. G., and N. Rex Hunt, Notes on Cronartium cerebrum. Phytopath. 8: 74. 1918.—Inoculations made with pedigree cultures indicate that the fungus which forms the fusiform type of gall (*Peridermium fusiforme* Arth. & Kern) is distinct either racially or specifically from that forming the sphaeroid gall (*P. cerebrum* Peck).—H. M. Fitzpatrick.

412. Hoffer, Geo. N., An aecium on red clover, Trifolium pratense L. Proc. Indiana Acad. Sci. 1916: 325–326. 1917.—The author records the occurrence at Lafayette, Indiana, of the aecial stage of *Uromyces (Nigredo) fallens* (Desm.) Kern.—H. S. Jackson.

413. Hopkins, E. F., The disease of tulips caused by Botrytis parasitica. Phytopath. 8: 75. 1918.

414. Jackson, H. S., Carduaceous species of Puccinia, I. Species occurring on the tribe Vernoniae. Bot. Gaz. 65: 289–312. 1918.—Descriptions or critical notes of 29 species of Puccinia from all parts of the world occurring on the host genera Vernonia, Elephantopus and Piptocarpha are given. Nine new species are described on Vernonia six of which were collected in Guatemala or Costa Rica and are described jointly with the collector E. W. D. Holway. The others are from Jamaica, Ceylon, and Bolivia. *Endophyllum Vernoniae* Arth. and *Argomyces Vernoniae* Arth. are transferred to Puccinia and new names proposed. *Argomyces insulanus* Arth. is also transferred to Puccinia.—H. S. Jackson.

415. Jagger, I. C., and V. B. Stewart, Some Verticillium diseases. Phytopath. 8: 75. 1918.—See detailed account in: Phytopath. 8: 15–19. 1918.—H. M. Fitzpatrick.

416. Jagger, I. C., and V. B. Stewart, Some Verticillium diseases. Phytopath. 8: 15–19. 1918.—See Entry 109.

417. Johnston, John R., and Stephen C. Bruner, A Phyllachora of the royal palm. Mycologia 10: 43–44. *Pl. 2.* 1918.—*Phyllachora Roystoneae* n. sp.—H. M. Fitzpatrick.

418. Jones, Fred Reuel, Yellow-leafblotch of alfalfa caused by the fungus Pyrenopeziza medicaginis. Jour. Agric. Res. 13: 307–330. *Pl. D, 25, and 26.* 1918.—*Sporonema phacidioides* Desm. is shown to be the conidial stage of this fungus, rather than that of *Pseudopeziza medicaginis*. A complete synonomy is given.—H. M. Fitzpatrick.

419. Keitt, G. W., Inoculation experiments with species of Coccomyces from stone fruits. Jour. Agric. Res. 13: 539–570. *Pl. 55–59. f. 1–3.* 1918.—A preliminary paper recording the results of over one thousand cross inoculations with *Coccomyces spp.* isolated from common species of Prunus. No attempt is made to summarize the results bearing on the limits of the species of Coccomyces used, but a paper which is to follow will do so.—H. M. Fitzpatrick.

420. Lehman, S. G., Conidial formation in *Sphaeronema fimbriatum*. Mycologia 10: 155–163. *Pl. 7.* 1918.—*Sphaeronema fimbriatum*, the fungus causing a black-rot disease of the sweet potato, has two types of conidia termed "hyaline conidia" and "olive conidia." The olive conidia are here stated to be produced exogenously. The hyaline conidia resemble the endoconidia of Thielavia as described by Brierley in certain respects but differ in others. While the first two conidia are regarded as endoconidia those produced subsequently are said to be exogenously produced.—H. M. Fitzpatrick.

421. Levine, M., The physiological properties of two species of poisonous mushrooms. Mem. Torr. Bot. Club 17: 176–201. *Pl. 1–2.* 1918.—Photographic reproductions of *Panaeolus venenosus* Murrill and *P. retirugus* Fr. are given.

422. Levine, M. N., and E. C. Stakman, A third biologic form of Puccinia graminis on wheat. Jour. Agric. Res. 13: 651–654. 1918.—Stemrust collected on volunteer wheat at Stillwater, Oklahoma, is found to differ parasitically from *Puccinia graminis tritici* and *P. graminis tritici-compacti*. A new trinomial is not proposed.—H. M. Fitzpatrick.

423. Long, W. H., An undescribed canker of poplars and willows caused by Cytospora chrysosperma. Jour. Agric. Res. **13:** 331–345. *Pl. 27–28.* 1918.

424. Long, W. H., and R. M. Harsch, Aecial stage of Puccinia Oxalidis. Bot. Gaz. **65:** 475–478. 1918.—Field observations and culture experiments supporting the conclusion that a previously undescribed *Aecidium* having unusual morphological characters which occurs on *Berberis repens* in New Mexico is the aecial stage of *Puccinia Oxalidis* (Lev.) Diet. & Peck. A description of all stages of the species is given.—H. S. JACKSON.

425. Martin, George W., Brown blotch of the Kieffer pear. Phytopath. **8:** 234–238. *f. 1–8.* 1918.—The fungus causing the disease is believed to be closely related to *Leptothyrium pomi*, or to be a variety of that organism. See Entry 330.—H. M. FITZPATRICK.

426. Melchers, L. E., Botrytis sp. causing severe injury to flowers and foliage of Pelargonium hortorum. Phytopath **8:** 76. 1918.—A species said to be closely related to, if not identical with, *Botrytis cinerea*, causing a disease of geranium.—H. M. FITZPATRICK.

427. Melchers, Leo E., and John H. Parker, Another strain of Puccinia graminis. Kansas Agric. Exp. Sta. Circ. 68: 1918.—Stemrust collected on wheat in the field at St. Paul, Minn., is found to represent a third biologic form of *P. graminis* on wheat. It is able to infect varieties of hard winter wheat which are highly resistant to the two biologic forms previously described. The name *P. graminis tritici-inficiens* is applied.—H. M. FITZPATRICK.

428. Murrill, William A., Illustrations of fungi—XXIX. Mycologia **10:** 177–181. *Pl. 8.* 1918.—*Mycena viscidipes, Laccaria amethystea, Leptonia conica, Laccaria striatula, Mycena galericulata, Omphalia fibula, Clitocybe farinacea, Marasmius dichrous,* and *M. institivs* described and illustrated in colors.—H. M. FITZPATRICK.

429. Murrill, W. A., Illustrations of fungi—XXVIII. Mycologia **10:** 107–110. *Pl. 6.* 1918.—*Trametes cinnabarina, Polystictus conchifer, Polyporus brumalis, Polyporus adustus, Polyporus amorphus,* and *Daedalea unicolor* described and figured in colors.—H. M. FITZPATRICK.

430. Murrill, William A., The Agaricaceae of tropical North America—VII. Mycologia **10:** 15–33. 1918.

431. Murrill, W. A., The Agaricaceae of tropical North America—VIII. Mycologia **10:** 62–85. 1918.

432. Murrill, W. A., Collecting fungi at Delaware Water Gap. Mem. Torr. Bot. Club **17:** 48–51. 1918.—A list, including 182 species of Ascomycetes, Uredinales, Hymenomycetes, and Gasteromycetes, of fungi collected in 1917 in the region about Delaware Water Gap, Pennsylvania.

433. Osner, George A., Stemphylium leafspot of cucumbers. Jour. Agric. Res. **13:** 295–306. *Pl. 21–24.* 1918.—*Stemphylium cucurbitacearum* n. sp.—H. M. FITZPATRICK.

434. Petch, T., Fungus diseases of food crops in Ceylon. Trop. Agriculturist **50:** 159–163. 1918.—The principal fungus and bacterial parasites of important agricultural plants are listed.

435. Potter, Alden A., and G. W. Coons, Differences between the species of Tilletia on wheat. Phytopath. **8:** 106–113. *f. 1–4.* 1918.—See Entry 133.

436. Pratt, O. A., Soil fungi in relation to diseases of the Irish potato in southern Idaho. Jour. Agric. Res. **13:** 73–100. *Pl. A and B.* 1918.—Nearly seventy different species or strains of fungi isolated from the soil are listed. Detailed descriptions of five new species of Fusarium are included.—H. M. FITZPATRICK.

437. Rhodes, Arthur S., Some new or little known hosts for wood-destroying fungi. II. Phytopath. **8**: *164–167.* 1918.—See Entry 354.

438. Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel and **Carl Hartley.** Host relationships of North American rusts, other than gymnosporangiums, which attack conifers. Phytopath. **8**: 309–352. 1918.—The North American species of Cronartium, Coleosporium, Gallowaya, Melampsora, Pucciniastrum, Melampsoridium, Melampsorella, Calyptospora, Necium, Uredinopsis, Melampsoropsis, and Chrysomyxa, and the unattached species of the form genera Peridermium, Caeoma, and Uredo which attack conifers are treated.—See Entry 355.—H. M. FITZPATRICK.

439. Roberts, John W., Plum blotch. Phytopath. **8**: 74. 1918.—*Phyllosticta congesta* on Japanese varieties in Georgia.—H. M. FITZPATRICK.

440. Seaver, Fred. J., Photographs and descriptions of cup-fungi—VII. The genus Underwoodia. Mycologia **10**: 1–3. *Pl. 1.* 1918.—Material of *Underwoodia columnaris* collected at Hudson Falls, N. Y., is figured and described.—H. M. FITZPATRICK.

441. Stakman, E. C., and **G. R. Hoerner,** Puccinia graminis tritici compacti in southern United States. Phytopath. **8**: 77. 1918.—A short abstract. See more detailed account in Phytopath. **8**: 141–149. 1918. See Entry 442.—H. M. FITZPATRICK.

442. Stakman, E. C., and **G. R. Hoerner,** The occurrence of Puccinia graminis tritici-compacti in the southern United States. Phytopath. **8**: 141–149. 1918.—The discovery of this rust on different hosts in widely separated localities indicates that it is not merely a local variant form of *P. graminis tritici.* See Entry 441.—H. M. FITZPATRICK.

443. Standley, Paul C., Rusts and smuts collected in New Mexico in 1916. Mycologia **10**: 34–42. 1918.

444. Stone, R. E., Orange rust of Rubus in Canada. Phytopath. **8**: 27–29. *f. 1.* 1918.—Spores of the orange rust, from both blackberries and raspberries collected in Ontario, and sown on wet slides produced typical germ tubes with no signs of promycelial formation. Later in the season the 2-celled stalked teleutospores were collected from the same plants.—H. M. FITZPATRICK.

445. Tanaka, Tyôzaburô, New Japanese Fungi. Notes and translations—IV. Mycologia **10**: 86–92. 1918.—*Botrytis liliorum* Y. Fujikuro on *Lilium longiflorum* Thumb., *Phyllosticta* (*Phoma*) *Kuwacola* K. Hara on leaves, shoots, and twigs of *Morus alba*, *Septobasidium acaciae* Sawada on *Acacia Richii*, *Cercospora pini-densiflorae* Hori et Nambu on needles of *Pinus densiflora*, *Helicobasidium Tanakae* Miyabe ex K. Sawada on *Morus*, *Vitis*, *Salix*, and other hosts in a considerable number of genera, *Nothopatella moricola* I. Miyake on *Morus alba*, *Ustulina Mori* K. Hara on *Morus alba*, and *Valsa Paulowniae* Miyabe et Hemmi.—H. M. FITZPATRICK.

446. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. Jour. Agric. Res. **13**: 437–450. *Pl. 51–52.* 1918.—A new species of Actinomyces isolated from sweet potato is named *A. poolensis.* It is apparently a wound parasite, and follows invasion by *Cystospora batata*, the parasitic slime mould described by Elliott. It is also pointed out here that *Acrocystis batatas* E. and Hals. is evidently identical with *Cystospora batata*; and the genus Acrocystis is stated to be invalid.—H. M. FITZPATRICK.

MYXOMYCETES

447. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. Jour. Agric. Res. **13**: 437–450. *Pl. 51–52.* 1918.—See Entry 446.

448. **Thomas, H. E.**, Cultures of Aecidium tubulosum and A. passifloriicola. Phytopath. **8**: 163–164. 1918.—See Entry 373.

449. **Weir, James R.**, Notes on the altitudinal range of forest fungi. Mycologia **10**: 4–14. 1918.—See Entry 13.

450. **Weir, James R., and Ernest E. Hubert**, Cultures with Melampsorae on Populus. Mycologia **10**: 194–198. 1918.—It is shown that the two rusts heretofore distinguished as *Melampsora medusae* and *M. albertensis* will each infect both Pseudotsuga and Larix, and in the absence of sharp differential morphological characters they are regarded as identical, i.e., *M. medusae*. *Larix lyalli* and *Pseudotsuga macrocarpa* are given as new hosts for this species.—H. M. Fitzpatrick.

451. **Weir, James R., and Ernest E. Hubert**, Cronartium coleosporioides on Pedicularis groenlandica. Phytopath. **8**: 63. 1918.—See Entry 152.

452. **Weir, James R., and Ernest E. Hubert**, A note on Hyalopsorae. Phytopath. **8**: 37–38. 1918.—See Entry 150.

453. **Weir, James R., and Ernest E. Hubert**, Notes on forest tree rusts. Phytopath. **8**: 114–118. 1918.—See Entry 153.

454. **Whetzel, H. H.**, The Botrytis blight of golden seal. Phytopath. **8**: 75–76. 1918.—The host is *Hydrastis canadensis*. The fungus is a member of the sub-division Microsclerotiae of the genus Botrytis, and has been found on diseased plants in Wisconsin, Michigan and New York.—H. M. Fitzpatrick.

455. **Wilson, Guy West.**, Rusts of Hamilton and Marion counties, Indiana II. Proc. Indiana Acad. Sci. **1916**: 382–383. 1917.—Includes notes on five species of Uredinales, three of which are previously unrecorded from the area covered. (Supplementary to **Wilson, G. W.**, Rusts of Hamilton and Marion counties, Indiana. Proc. Indiana Acad. Sci. **1905**: 177–182. 1906).—H. S. Jackson.

456. **Wilson, Guy West**, Studies in North American Peronosporales—VII. New and noteworthy species. Mycologia **10**: 168–169. 1918.—*Peronospora grisea* Unger found near Carmel, Indiana, on *Veronica arvensis* and *V. peregrina*; *Peronospora Seymourii* Burrill collected on *Houstonia minor* at Iowa City, Iowa, believed to be the third collection; *Rhysotheca* (*Plasmopara*) *Acalyphae* sp. nov. on *Acalypha virginica* at Madison, Wisconsin by T. T. Davis.—H. M. Fitzpatrick.

457. **Wolf, Frederick A., and E. E. Stanford**, A Macrophoma disease of figs. Phytopath. **8**: 24–27. *Fig. 1–2.* 1918.—The organism is believed to be identical with *Macrophoma Fici* Alm. & S. Cam. Material from North Carolina is compared with collections from Texas and Africa. The conidia are extremely variable in size and form, and are not infrequently 1–2-septate.—H. M. Fitzpatrick.

458. **Zeller, Sanford M.**, An interesting fungus from Friday Harbor, Washington. Pub. Puget Sound Biol. Sta. **2**: 95–96. 1918.—Locality and description of *Rhizopogon diplophloeus* Zeller & Dodge.—T. C. Frye.

459. **Zeller, S. M., and C. W. Dodge**, Gautieria in North America. Ann. Missouri Bot. Gard. **5**: 133–142. *Pl. 9.* 1918.—The authors give a list, with key, of species (five in number) of the genus known to occur in North America; descriptions, synonomy, references to illustrations, information as to distribution, and critical notes accompany the species. *Gautieria villosa* Quelet is placed in synonomy under *G. morchelliformis* Vittadini. *G. plumbea* is described as new. *Chamonixia caespitosa* Rolland is included under the extra-limital and

doubtful species, and while the authors suspect that the species belongs to Gautieria th do not make the transfer; under the same heading critical notes are given for two additior species of Gautieria.

460. **Zimm, L. A.,** A wilt disease of maples. Phytopath. **8:** 80–81. 1918.—A species Verticillium.—H. M. FITZPATRICK.